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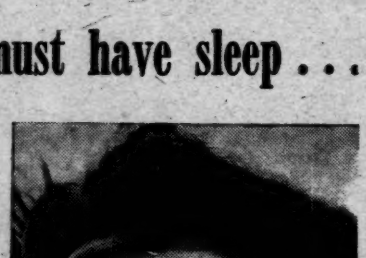

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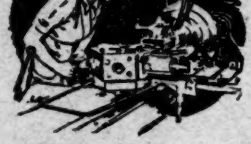

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 20 1943

SOCIAL MEDICINE: ITS MEANING AND ITS SCOPE

BY

JOHN A. RYLE, M.D., F.R.C.P.

Professor of Social Medicine in the University of Oxford

"Salus populi suprema est lex"

There has been much discussion in the medical journals and the daily press in recent months as to the purport and prospects of social medicine. In the minds of some of the profession there would appear to linger a confusion of thought as to the meaning of the term; some uncertainty even as to the underlying ideas which have prompted the discussion. The laity and members of the social services and student bodies are eagerly seeking enlightenment; less harassed and preoccupied and, perhaps, more hopeful of the future than the overworked doctor, they have sometimes appeared more receptive and understanding than the profession whose intimate concern these ideas must shortly become. The prevailing uncertainties would seem to be based upon two main misconceptions: (1) that social medicine is just another name for preventive medicine as we now know it, and (2) that social medicine and socialized (or State) medicine are synonymous. It seemed to me that it might be helpful to trace the sources of these misconceptions and to attempt a brief account of what the actual meaning and objectives of social medicine are in the view of those who have, for longer or shorter periods, insisted on the need for an evolutionary change in much of our general teaching, philosophy, and practice.

A Recent Awakening

We are most of us conscious of the fact that medicine during the past quarter of a century has become (inevitably, be it allowed) not merely more specialized but also more technical, and that in the process—for the technicalities are often precise, intricate, and time-consuming—the old aetiological interest and humanism of our fathers have tended to take a second place. In the teaching hospitals this can scarcely be disputed. Investigation to the limit, mainly by objective methods and often with too little said to or done for the patient during or after the tedious process, has been the prevailing trend, especially in the case of the more chronic or seemingly more obscure varieties of disorder and disease. More and more accurate assessments of local pathology, with the help of more and more colleagues and instruments, and less and less intimate understanding of the patient as a whole man or woman with a home and anxieties and economic problems and a past and a future and a job to be held or lost, have become the order of the day. As we direct our students, so in large measure must the outlook and method of each new generation of doctors be determined. Over-reliance on specific objective tests; too strong a belief in the potency of certain treatments aimed at altering established disease-states or too deep a despair at the apparent unalterability of others; too little knowledge of morbidity and mortality figures, of the relative incidence of diseases in the community, of the vast prevalence of "illness" or "debility" without "physical signs" and of their several significances; too vague an appreciation of the fact that these illnesses and, indeed, many of the organic diseases have discoverable origins in social, domestic, or industrial maladjustment, in fatigue, economic insecurity, or dietary insufficiency—have not these already set their stamp upon the work and outlook of the younger generation of practitioners? And are the majority of those who teach them, most of whom have but little close acquaintance with the conditions in which their poorer hospital patients live and work, much wiser? There are notable exceptions, it is true, but their numbers dwindle. The sciences and techniques have come to dominate medicine to the exclusion of the most important science of all—the science of man—and the most important technique of all—the technique of understanding. Science without humanism may work with atoms but it will not work with men.

In the United States, where this "mechanized" medicine has perhaps captivated the thought and action of the doctor even more than in this country, there has been a recent awakening to the need for a return to the older methods of study and assessment, the methods of the general physician—the methods which the writings of a Trousseau or an Osler were ever at pains to describe but which are often barely mentioned in modern textbooks. Canby Robinson (1939) has told how at Johns Hopkins it was found necessary to launch a new experiment with a physician and assistants to stand in a special personal relationship to the patient—a relationship which all the specialists and interns responsible for his more specific investigations and treatments somehow failed to achieve. With the aid of the trained medical social worker and with closer collaboration with the departments of public health and assistance, the interdependence of clinical, social, and environmental studies and the contribution which each can make to a better appreciation of aetiology and prognosis and to a better organization of after-care are now being taught to the student in several of the American schools. Visits are made to the environment in which illness has had its beginnings. Tuberculosis and venereal disease are being considered as human, educational, and social problems, and not merely as medical and surgical problems with their set routines for diagnosis and therapy. The neuroses and psychoneuroses, it is found, are often better helped by these new alliances than by calling yet another specialist to the bedside while the physician or surgeon, who has "excluded organic disease," retires from the scene with a sigh of relief for something accomplished—even though it was a "negative" something where the patient was concerned.

Causes of Misconception

Unprofitable trends in clinical teaching and research, educational errors at various stages in the curriculum—quite as much as its overcrowding—would indeed seem to be among the initial causes of misconception, of the failure to appreciate what social medicine, a direct development and expansion of clinical medicine, seeks to provide for the student and for the individual patient and for those closer and more useful relations between the people and their medical services which we would all like to see established. For social medicine, as its name implies, clearly has a main concern with the group as well as the individuals composing the group, with the many and varied problems created by sickness in the family and the community as a whole. The illustrations or texts

for the contributions which it makes, or at present fails to make, are often to hand in the ward and out-patient clinic, and should be first presented there, but there are many larger problems to be explored "in the field."

The Third Epoch of Preventive Medicine

We are living to-day at the end of the second (or the beginning of the third) of the three great historical epochs of preventive medicine in this country. Starting a hundred years ago with Chadwick—followed a little later by Parkes and Simon, Southwood Smith and Farr—the first epoch was occupied with the disclosure of the appalling conditions in which the working classes then lived, of the prevailing lack of sanitary provisions, of the hovel-like homes, of the defective and contaminated water-supplies; of the high death rates; and with the earlier endeavours to limit the ravages of the acute infectious diseases—typhus, typhoid, smallpox, cholera, and the malignant scarlet fever of those days.

The second epoch has continued and extended the work of the first, but it has also witnessed the attack on the chronic infective diseases—tuberculosis, venereal disease, and now (we may hope), with an improved understanding of its intimate connexions with poverty and crowding and streptococcal throat infections, on rheumatic fever, which (with chorea and rheumatic heart disease) remains second only as a cause of death to phthisis between 5 and 45 in women and follows phthisis and violence in men (Morris and Titmuss, 1942).

The idea that many non-infective diseases can also be considered as preventable and so may eventually be brought within the jurisdiction of a nation's health authority has sunk more slowly into the consciousness both of the profession and of the laity. But before our eyes and in the space of four years of war we have seen the work of the great students of nutrition bear fruit, a Ministry of Food established, and our people as a whole in better health through better feeding, in spite of many shortages, than they were in times of peace. Measures to secure better standards of nutrition, better housing, and better education, and to reduce industrial fatigue and hazards (although in all these directions we still have a long way to go) have marked the beginning of our third epoch. In this period we have realized not only that many non-infective diseases (including rickets, chlorosis, other nutritional anaemias, and much retarded physical and mental development) are readily preventable, but also that by preventing them and raising the general standards of health—*especially in early life*—we assist indirectly the attack on morbidity and mortality due to the diseases of infective origin (including tuberculosis and, in all probability, most of the acute infectious fevers of childhood). Universal pasteurization of milk and an extension of diphtheria immunization could carry us a stage further.

There remain, however, other diseases in plenty which must be regarded as in large degree preventable through socio-medical reforms: diseases which are associated with faulty habits of life or conditions of living; diseases too which are, in our existing order, becoming yearly more prevalent. Of such, for example, are gastric and duodenal ulcer, now greatly on the increase, and the psychoneuroses. Peptic ulcer in the industrialized countries is competing with tuberculosis and rheumatic fever, not as a cause of mortality (although that is serious enough), but as a cause of sick-wastage, of chronic or recurring disability affecting men and women at the time of life when they should be most useful and most active and their responsibilities are greatest. It affects certain physical and temperamental types more than others; it affects all social groups, but whether equally or unequally we do not yet know. It is a disease notably of the latter half of the industrial era, the era of money-getting and money-lack, of occupational and domestic anxiety, of wars and rumours of wars, of restless living and "snack" meals and excessive tobacco consumption. Its therapeutics leave much to be desired. Its prevention has not been seriously considered. In common with other non-infective diseases it has not come within the scope of our present public health organization. What was once a relatively rare disease can, however, become so again when our work and our social and individual lives are better planned.

The same factors which have increased the incidence of peptic ulcer and a prominent group of visceral disorders commonly described as "psychosomatic" (an unsatisfactory title, since all diseases have their physical and mental components) have been partly responsible for the prevalent psychoneurosis in the community. Faults of upbringing, domestic stress, industrial fatigue, inadequate sleep and holidays, economic anxieties—factors eventually alterable by improved education, more ample accommodation for families, factory welfare, and social insurance—have also played their significant part. In the meantime we try to cope with their consequences with bottles of medicine and certificates and a multiplication of psychiatric clinics at an ever-increasing cost to the community.

Endemic goitre persists in many rural areas along the goitre belt of England. We know that it is largely preventable and that it has been partially controlled in other countries, but have not yet taken purposeful steps to control it in our own. Even cancer, quite apart from its occupational varieties, has its social or class differentiations, for deaths from cancers of the surface and of the stomach and upper alimentary tract are approximately twice as common in the poor as in the more privileged sections of the community. Dental disease (almost unknown in some native communities) is almost universal with us, but in its graver forms common only among the poor, and has many serious secondary consequences.

A Socio-Medical Problem

Good food and habits of feeding, good houses, better facilities for open-air activities and cleanliness, better education and cultural opportunity, holidays and social security—could they be extended to the populace as a whole—would bring benefits, both human and economic, to the individual and to the State beside which those accruing from all our remarkable advances in remedial medicine and surgery of the last century, valuable though they have been and must remain, would make but a poor showing.

The evidence for such contentions is already available in existing statistical studies of the differential mortality figures as disclosed in the Registrar-General's records relating to the five main social groupings; and mortality is only a very partial index of morbidity. Whether we consider deaths from tuberculosis or rheumatic heart disease or the infantile death rate, the figures mount steadily as they are traced from the economically favoured classes to those in the lower-income groups. Notwithstanding that there has been a satisfactory downward trend in infantile mortality—always a delicate index of social condition—in each of these social groups, there is some evidence for an increasing disparity in the mortality rates as between the highest and lowest groups (Titmuss, 1943). According to our national statistics for the period 1930-2 the disparity in mortality in the first month of life as between the best and worst economic grades was of the order of 50%, but in the latter phase of post-natal life (i.e., 6 to 12 months) the difference was as great as 439%. Before the war the infant death rate in some of our northern industrial cities was as much as three times that in certain suburban districts of Surrey, and British figures compared unfavourably with those from other progressive countries. The bearing of all this on national efficiency and happiness and on the population problem need scarcely be stressed. Outside the relatively small "social problem" group there is no good evidence of genetic inferiority among the poorer classes. The situation should therefore be regarded as susceptible of ultimate amendment by economic and environmental changes.

These and other cognate findings concerning the influence of class, occupation, or geography on health have been frequently reported upon by our leading statistical authorities. They are available in papers or publications by Major Greenwood, Percy Stocks, Bradford Hill, H. M. Vernon, and many others in this country, and in various reports prepared for the Medical Research Council. But the lag between discovery or demonstration and action is ever a long one. Here, however, is a socio-medical, a human, situation which we cannot lightly accept and of which we should all be more than vaguely aware. Of the mass of non-lethal disease, much of it alterable or avoidable, we have no reliable records, but the Peckham Health Centre experiment (1938) and its family studies have given us a disturbing picture of the extent of urban unfitness and have suggested some of the measures which could help to lessen it. *Our Towns: A Close-up* (Oxford University Press, 1943) and other wartime revelations have also thrown light in dark places for the general public and for those of our profession whose particular experience has been remote from the lives of those who work in slum or factory or mine or who man the ships of our great but grimly unhygienic merchant navy. A more detailed knowledge of these things—in brief, of ultimate causes—is surely as much due to the medical student and the practitioner as is a detailed knowledge of bacteriology or morbid anatomy. If they

are ill informed, or if their own experience in the social and medical fields remains too limited or uncommunicated, how can we expect the people, as voting citizens, and their municipal or parliamentary representatives to know and act?

And how much yet remains to be done in the shape of combined medical and social inquiry! At present we have no reliable morbidity (as distinct from mortality) statistics apart from those relating to the notifiable diseases. Nor have we sifted, as carefully as we shall have to sift, the particular influences operating within the three main adversities due respectively to low economic, environmental, and educational standards. Nor have we seriously begun to study health itself within its considerable ranges of variation for age, sex, and occupation, or to determine the manifestations and standards which distinguish the individual in "full health" from the individual with "no demonstrable disease" or with early illness. We have much to learn from periodic health examinations and the study of fit groups in childhood, adolescence, and later life, and especially in the schools and Services. Growth and development in differing environments await a much fuller investigation. There is no lack of material for the student of social disease and disability, and of those states of physical, mental, and moral health or "wholeness" which must provide the target for our human planning. While disease accompanying poverty and manual toil provides a problem of far greater magnitude it should also be remembered that there are diseases of affluence or due to professional overwork and anxiety which better education and individual discipline and hygiene could conspicuously reduce. Man and his heredity, his types, and his reactions to environmental stress are inexhaustible studies.

New Training and Opportunity

But enough, perhaps, has been said to explain why social medicine—no new concept and certainly not a new specialism, for its principles have long been germinating in the minds and reflected in the motives of all good practitioners and health officers—has required and received its new impetus; enough, too, to indicate its wide scope and that it envisages something far more comprehensive than our existing preventive medicine. It is a concern of all branches of our medical and health services, remedial and environmental, and of their ancillary services, and, among these in particular, of the hospital and municipal social worker. It must eventually invoke, through health education as an essential part of a broader general education continuing into adult life, the co-operation of the public as a whole. Its teachers, although special appointments in medical schools and institutes will be required in due course, must come to include all teachers of the main clinical subjects. Social medicine is indeed a necessary interest of the general physician, whose numbers within our schools must surely be increased and whose demonstrations could often be both clarified and amplified by fuller and more frequent references to initial or basic aetiology, and to rehabilitation and subsequent care, as an offset to concentration upon particular pathologies and immediate treatments. The co-operation between clinical teacher and hospital almoner (as social worker) in ward and clinic must become much closer.

The students and investigators of social medicine have long been active, and will continue to be found especially among the epidemiologists and medical statisticians; they will be found among the workers on human nutrition, on industrial psychology and industrial and domestic fatigue, and on maternity and child welfare; or among Service medical officers with their fine opportunities for studying large bodies of fit men or men in the process of being trained and fed to a finer level of physical and mental efficiency and resource than their civilian lives allowed; and, last but not least, among all those physicians or surgeons whose interest has led them to the study, in home and clinic and hospital, of the broader natural history of man in disease (or health); of man as he continually reacts, emotionally and physically, not merely to the single noxious agent but to the multiple circumstances of his whole life and environment. For such as these and others with other problems our departments of social medicine will come to provide new training and opportunity.

The practitioners of social medicine will, it need hardly be said, eventually include the whole of the practising part of the profession as well as the officers of the environmental services. There is no sharp division between individual and social medicine. Health education and periodic health examination will some day supplement the remedial activities of the general practitioner, and co-operation with his colleagues of the public health service will be a far closer one than it is to-day.

The Physician's Mission

And, finally, what should be said of the confusion which has arisen in some minds between social medicine and socialized or State medicine? Although social medicine and the planning for a comprehensive medical service, through the stimulus of the times we live in, have come simultaneously under review in the medical and the general press it should be abundantly clear, from what has gone before, that social medicine has no immediate concern with medical or other politics. That it will (in common with all other scientific and educational developments having a bearing on human betterment) influence legislation and prompt reforms in the fullness of time cannot be disputed. Jenner's observations and experiments were a precursor of compulsory vaccination. Osler's teaching expedited the attack on typhoid and tuberculosis. Without Gowland Hopkins, Edward Mellanby, John Boyd Orr, and others of our own day it may be doubted whether we should have had school meals or Lord Woolton and a Ministry of Food which—in our crowded island and in the midst of a long world war—has helped already, by legislation and organization, to improve the general state of fitness of the people.

There are those, it is true, who feel entitled to believe that social and individual medicine will find a better opportunity under a reorganized, co-operative and comprehensive medical and health service in which the uneconomic and often inequitable separations into "voluntary and municipal," "private and panel," and "preventive and remedial" services will no longer obtain. But the advocacy of changes of this kind is no more a function of social medicine than, let us say, the nationalization of the chemical industries is a function of the chemical sciences, or the framing of new regulations for the mines a duty for the Medical Research Council's Committee on Silicosis.

It may properly be argued that many of the social evils, so widely manifest by disease, which have been cited above call not for medical action but for drastic social and economic reform. For these the electorate through their representatives, and not the doctors (as doctors), must become responsible. But who unearths and exposes the evils and their secondary effects? The factual evidence, the socio-medical experience, the statistical data—all of which must be carefully and laboriously collected and analysed—must continue to be provided by the doctors and their scientific associates and field-workers and particularly by those whose concern is rather with the social than with the individual aspects of disease. Whether in this basic manner, or more immediately as an educator of opinion, or incidentally in the course of his daily professional activities, we have reached a time in which "the physician" (to quote Prof. Sigerist) "must assume leadership in the struggle for the improvement of conditions." Without research and teaching in social medicine to guide him he cannot faithfully fulfil his mission.

Conclusion

In summary, social medicine means what it says. It embodies the idea of medicine applied to the service of man as *socius*, as fellow or comrade, with a view to a better understanding and more durable assistance of all his main and contributory troubles which are inimical to active health and not merely to removing or alleviating a present pathology. It embodies also the idea of medicine applied in the service of *societas*, or the community of men, with a view to lowering the incidence of all preventable disease and raising the general level of human fitness.

As one who has been made responsible for the first institute of social medicine in this country and whose training and teaching for more than 25 years have been essentially clinical, I should like to add that I regard social medicine (for all its needful associations with public hygiene) as a logical development from and a direct expansion of clinical medicine, of medicine construed in its best Hippocratic sense and activated by the highest Hippocratic ideal; for "where there is love of man there also is love of the Art."

Of the work and intended programmes at Oxford it is too soon to speak, for they are but in their infancy. Suffice it to say that the Institute already houses the Oxford Nutrition Survey and is about to house one of two experimental bureaux supported

by the Nuffield Trust (the other based on Glasgow) for the collection and analysis of morbidity statistics; that it is sponsoring some studies of endemic goitre in rural England; and that its director and his colleagues have recently initiated regular socio-medical teaching and demonstrations (with the help of the hospital staff and social workers) for students in their clinical years at the Radcliffe Infirmary. Close co-operation with the Institute has been generously offered by the public health authorities of the city of Oxford and of the county. For our team of graduate assistants we shall have to wait until demobilization provides them with their opportunity for new service and us with a new stimulus.

To those in our universities or health departments, in practice, or serving with the armed Forces who are interested in these things and in the needs of the future it seems that the ideas and tasks of social medicine may be justly regarded as essential contributions (perhaps the most essential and practical of any at present within our range) to the developing philosophy of scientific humanism. The potentialities of this philosophy are very great. Wherever our science, our faith, and unpredictable chance may lead us it can now scarcely be doubted—even while the present mad epoch of destruction continues—that we are moving upon the borders of new and possible worlds. To the rational and humane enrichment of these worlds the profession and the sciences which have the most intimate concern with man himself—a very social animal—have surely much to offer. To envisage and design a close equality of opportunity for health in the coming generations is no longer an extravagant fancy. Whether at home, in India or the colonies, or in the broader international field, it may shortly become our most urgent common interest. Nor should we forget that in our Dominions and other countries, and notably in the land of our most virile and victorious ally, there have been important experiments in social medicine and hygiene from which we have much to learn.

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THE THERAPEUTIC VALUE OF GAS-GANGRENE ANTITOXIN*

BY

M. G. MACFARLANE, Ph.D.

Secretary, Subcommittee on Anaerobic Wound Infections

Gas gangrene is characteristically a disease due to the invasion of tissues and the production of toxins by anaerobic bacteria of the Clostridium group present in infected wounds, particularly in wounds involving muscle. The most rational treatment appears to be a combination of measures—the use of surgery and bacteriostatic drugs to control the infection, and the use of antitoxin to alleviate the toxaemia. The War Wounds Committee of the Medical Research Council accordingly recommended (*M.R.C. War Memorandum No. 2*, 1940) that antitoxin should be used in conjunction with surgery and chemotherapy in the treatment of gas gangrene, the procedure then advised being the intravenous injection of 13,500 units† of polyvalent antitoxin as soon as possible after diagnosis, repeated according to the signs. In order that the value of this and other lines of treatment could be assessed, surgeons were asked to make detailed returns of all cases of gas gangrene and of lesser anaerobic wound infections on the forms issued (Army Form I 1241 and its supplement I 1241A). Through the courtesy of the Medical Directors-General of the three fighting Services and the E.M.S. the returned forms have been made available for study, and enough data have now accumulated for a preliminary analysis of the therapeutic value of antitoxin.

Evidence of the value of the specific antitoxins in the treatment of gas gangrene developing in wounded men was brought forward by Weinberg and Séguin (1918); promising results were also obtained in 1918 by British workers (Medical Research Committee, 1919). MacLennan (1943a, 1943b) has recently made a detailed report on the clinical and bacteriological features of the anaerobic wound infections encountered in the Middle East Forces, in which he discussed the value of the various lines of prophylaxis and treatment. His demonstration that in a group of patients which comprised 70% of all the cases of true gas gangrene reported in these Forces the fatality rate was significantly lower among those who had received antitoxin provides further evidence of the therapeutic value of polyvalent antitoxin in field conditions. The present survey is based primarily on all the reports (259) of anaerobic wound infections received by the Medical Research Council up to June, 1943, excluding those from the Middle East Forces, and is concerned only with the value of antitoxin in the treatment of established cases of gas gangrene. The question of its prophylactic value will not here be discussed; it will only be repeated, as MacLennan has already pointed out, that the prophylactic value cannot at present be determined, as the necessary information on the number of casualties that have received this prophylaxis and have *not* developed gas gangrene is not yet available. The occurrence of gas gangrene in a patient who has received antitoxin soon after wounding is an individual failure of prophylaxis which is without significance, in a statistical sense, until the total number receiving this prophylaxis is known.

Object of the Present Analysis

It is not to be expected that gas-gangrene antitoxin will be of value in the treatment of anaerobic cellulitis and lesser clostridial infections without toxaemia. In order to provide an adequate and reasonably uniform test of efficiency, only those cases (treated or untreated) have been included in this analysis in which the presence of *marked toxaemia*, accompanying other signs and symptoms of gas gangrene, was recorded by the clinician. Since bacteriological confirmation of the diagnosis was, for obvious reasons, not always attainable, the possibility that some cases were due to streptococcal infections (MacLennan, 1943a) is not excluded. The figures in the ensuing paragraphs refer to the toxic cases on which the analysis was finally made.

The evaluation of a single therapeutic measure in gas gangrene is complicated by many variables, particularly in field conditions. First, there are the factors which may determine whether treatment as a whole is effective: these include the interval between the onset of the disease and treatment, in relation to the rate of development after onset; the site of the wound and the general condition of the patient; the nature of the pathogenic clostridia present, and of concomitant infections; the facilities for surgery and nursing. So far as is possible with the data available, these factors will be taken into account by grouping similar cases together and analysing the groups separately. Secondly, since the treatment advised consists of two measures—the use of surgery, to which the employment of drugs is ancillary, and the use of antitoxin—it is necessary to evaluate both measures. Thirdly, it is necessary to know whether there has been any selection of cases for treatment.

It may be useful to discuss here the general aspects of the probabilities with regard to the effectiveness and the practice of the two main lines of treatment. The necessity for speedy and adequate surgical treatment of patients with established gas gangrene is well recognized and has been repeatedly urged. The patients in whom gas gangrene developed formed a very small proportion of the total number of wounded, and were under the care of surgical specialists; the high general level of skill and care afforded can be gauged from the very low general fatality rate of patients with limb injuries—that is, with wounds of a type prone to develop gas gangrene (Pulvertaft, 1943). As might be expected, appropriate surgical measures were recorded in the majority (86%) of the reports

* A report to the War Wounds Committee of the Medical Research Council.

† Therapeutic dose: 7,500 i.u. *Cl. welchii* antitoxin; 3,750 i.u. *Cl. septicum* antitoxin; 2,500 i.u. *Cl. oedematiens* antitoxin; 20% in excess in each ampoule = 16,500 units polyvalent antitoxin.

here analysed; the only reasons given for the omission of such measures were that the patient was too ill for operation and that gas gangrene was not diagnosed before death. For the present object it is not necessary—and certainly not within my competence—to criticize the surgical treatment in an individual patient; but the time of intervention and its effectiveness as judged by the recurrence or otherwise of infection after amputation have been considered.

The position with regard to the use of antitoxin was different, since its therapeutic value was not fully established. It might be suspected that its early and energetic use would be prompted largely by personal faith, and that its use at a later stage would often be due to a last hope of saving life. It has been realized that many were unfamiliar with the theory and practice of antitoxin therapy. It is a recognized principle that if antitoxin is given at an early stage of an infection by toxigenic bacteria it will be more effective in saving life than if it is given later, and that the amount of antitoxin needed for an individual patient cannot be arbitrarily prescribed. Though antitoxin was given to the majority (82%) of the patients, little more than half of them received it promptly or by intravenous injection, and frequently the dose was not repeated. The time of administration of gas-gangrene antitoxin is indeed a factor in determining its effectiveness; it is therefore very important to know whether the patients treated promptly with antitoxin were selected because they were less severe cases, since these might respond better to any form of treatment. The total amount of antitoxin given is also a factor, but a statistical analysis of the relative effect of different amounts of polyvalent antitoxin would require full bacteriological data, which are not yet available. It should therefore be emphasized that the main object of the present analysis was to find out whether antitoxin was of *any* value in treatment, by comparison of the fatality rates of the treated and untreated cases; the extent of this value is dependent on a number of factors, including, no doubt, the size of the dose of antitoxin.

Throughout this report a difference is regarded as significant if it exceeds twice its standard error, in which case it would occur by chance less than 5 times in 100 trials. If two groups differently treated show a "significant" difference of fatality the result does not *prove*, in the colloquial sense of the word, that the difference was due to the method of treatment, but it is reasonable to suppose so unless it can be shown that the groups were differentiated also in some other way.

Reports on Anaerobic Wound Infection

The reports received on cases of anaerobic wound infection fell into three series, excluding 6 in which the necessary data for tabulation were lacking:

Series I.—88 reports on casualties in the B.E.F. in May and June, 1940, returned on Army Form I 1241 (Dunkirk cases). In many of these reports the data recorded were not sufficient for the differentiation of toxic and mild cases, nor was it possible to distinguish casualties wounded in battle in Flanders from those wounded on the beaches. The entire series has been omitted from the analysis because the criterion for inclusion could not be applied; from other information available it seems probable that many of these cases were not examples of true gas gangrene, but rather of lesser forms of anaerobic wound infection.

Series II.—85 reports on casualties in the M.E.F. from 1940 to 1943. Most of these reports were considered by MacLennan (1943b) together with information on additional cases which had not been reported on Army Form I 1241. To avoid confusion this series has been omitted from the analysis, but the data obtained by MacLennan are quoted. The outstanding features of this series of cases were wounding in the desert, delay in treatment, with a high proportion of cases established on admission, and the frequent incidence of *Cl. oedematiens* infection.

Series III.—165 reports of anaerobic wound infections from other theatres of war, returned on Army Form I 1241 and its supplement between Aug., 1940, and June, 1943. In the supplement clinicians were asked to report the presence and degree of general toxaemia. The criterion of gas gangrene taken for inclusion of a case in this analysis—the presence of marked toxaemia—was noted in 139 cases (85%). Three others were reported as "anaerobic wound infection without gas gangrene." Of the remaining 23 patients, 5 received prophylactic and therapeutic doses of antitoxin, 10 received a therapeutic dose, and 8 received no antitoxin; all these 23 subjects made satisfactory progress with, in general, the minimum of operative intervention, and in the absence (or non-recording) of marked toxaemia it was doubtful if they could be included as "survivors from gas gangrene," either in the treated or in the untreated group.

The patients in Series III were grouped first according to Service, etc., and to the circumstances of wounding:

(*a*) 38 civilian air-raid casualties.

(*b*) 42 Army casualties treated in this country. In most of these patients the wounds were similar to battle wounds—i.e., caused by trench mortars, splinters, and bullets—and appear to have been sustained in accidents.

(*c*) 11 R.A.F. casualties treated in this country. There is no evidence that any of these patients was wounded during an operational flight.

(*d*) 17 casualties from the Royal and Allied Navies and Merchant Navies. These were scattered cases treated variously in this country, in hospital ships, and in medical units of the M.E.F. and B.N.A.F.

(*e*) 52 casualties from British, Allied, and enemy land and air Forces, treated in medical units of the B.N.A.F. between Oct., 1942, and May, 1943.

(*f*) 5 casualties in the Army over-seas.

Some particulars of the groups in Series III are shown in Tables I and II.

TABLE I

Group of Series III	Total Cases	Toxic Cases	Dths.	Fatality (% of Total Cases)	Amputations (% of Total Cases)	Transfusions or/and Infusions (% of Total Cases)
Civilian	38	32	20	52·6	50·0	58·0
Army U.K.	42	34	17	40·4	54·8	54·7
R.A.F. U.K. ..	11	11	7	63·6	36·4	54·5
Naval and seamen ..	17	16	9	52·9	29·4	68·8
B.N.A.F.	52	43	25	48·1	50·0	63.5
Army over-seas ..	5	3	1	20·0	20·0	80·0
Total	165	139	79	47·9	47·3	60·0

TABLE II

Group of Series III	Toxic Cases	Estab. on Admission	No Antitoxin		With Antitoxin		
			Cases	Dths.	Cases	% of Total	Dths.
Civilian	32	6	5	5	27	84·5	15
Army U.K.	34	4	3	3	31	91·5	14
R.A.F. U.K. ..	11	0	2	2	9	81·8	5
Naval and seamen ..	16	7	4	3	12	75·0	6
B.N.A.F.	43	21	11	8	32	74·5	17
Army over-seas ..	3	1	0	0	3	100·0	1
Total ..	139	39	25	21	114	82·0	58
Mean fatality rate			84·0%		50·9%		

Difference = 33·1 ± 10·9

$\frac{\text{Diff.}}{\text{S.E.}} = 3{\cdot}3$

As might be expected from the difficulties of collection and transport, the proportion of the cases of gas gangrene in which the disease was already established on admission to hospital is much higher among the casualties wounded in battle—and in the few cases among those wounded at sea—than among those wounded in this country. The proportions of toxic cases, amputations, transfusions, and deaths, and the proportions of the total number of toxic cases treated with antitoxin, are not, however, significantly different in the different groups. It will be seen from Table II that the mean fatality rate for all the patients who received antitoxin is significantly less than for those who did not receive it. Moreover, the fatality rate of the treated patients is lower in each of the constituent groups, in spite of gross differences between these various groups in the circumstances of wounding—such as the nature of the soil and climate, the cause of injury, and the physique of the patients—and in the general facilities for treatment of casualties. It has been considered permissible, therefore, since the numbers in each group are too small for further subdivision, to take the series as a whole and regroup the cases according to the time and nature of treatment and the nature of the wound.

The cases have been graded according to the time of administration of antitoxin as follows: (*a*) initial dose given within 6 hours of diagnosis; (*b*) initial dose from 6 to 24 hours after diagnosis; (*c*) initial dose more than 24 hours after diagnosis. Owing to lack of detail in some reports it is not possible to distinguish between intravenous and intramuscular injection, but at least 40% of the cases in the first category received the initial dose intravenously: the initial doses ranged from 4,000

units intravenously at the time of diagnosis to 40,000 units intramuscularly. The time of administration was not always given explicitly: in the few instances in which it was not clear from the context that the dose had been given within 6 hours the case was placed in the 6–24 hour category.

Effect of Delay in Treatment

Treatment should properly be judged in relation to the time of onset of the disease, but in practice this is impossible, as the time of onset even in cases developing in hospital was often not known within several hours; generally the time noted was the time of diagnosis. When the patient was admitted with established gas gangrene, only the maximum possible interval between onset and diagnosis could be gauged from the time of wounding.

TABLE III

Antitoxin Therapy	Onset in Hospital			Established on Admission		
	Cases	Dths.	Fatality	Cases	Dths.	Fatality
			%			%
Nil	19	17	89·5	6	4	66·7
24 hours after diagnosis ..	8	5	62·5	1	1	100·0
6 to 24 hrs. „ „ ..	22	19	86·4	7	4	57·2
0 to 6 „ „ „ ..	51	22	43·0	25	7	28·0
Total	100	63	63·0	39	16	41·0

It might well be expected that the interval between onset and treatment would be so much longer in the cases already established on admission to hospital that treatment with antitoxin would be too late to be effective, and the fatality rate therefore higher than that of comparable cases developing in hospital. In Table III, however, no significant difference can be demonstrated between the fatality rates for the corresponding category of antitoxin therapy in the two groups. It could no doubt easily happen that the disease might develop in some patients during evacuation, only an hour or so before their arrival and examination at the hospital, so that they received treatment more promptly than others, already in hospital, in whom the disease developed more insidiously. Be that as it may, it appears probable that there was no material difference between these two groups in the range of time between onset and diagnosis, and that there is therefore no necessity to analyse the groups separately with respect to other factors. It will be realized that this is a finding particular to this series of cases, in which the majority of the gas-gangrene infections established on admission occurred in a single campaign; in different circumstances the patients in whom the disease developed during evacuation might be received too late for treatment to be effective.

Selection of Cases for Treatment

It was previously mentioned that it was necessary to know if the patients treated early with antitoxin were selected because they were less severe cases who would have responded better to any treatment. One test of the relative severity of the cases in the treated and untreated groups at the time of diagnosis is to ascertain the proportion of rapidly fatal cases in each group. Table IV shows the numbers and proportions of the patients in each group dying at different intervals after diagnosis.

TABLE IV

Time of Death after Diagnosis	No Antitoxin		Antitoxin after 24 hrs.		Antitoxin 6 to 24 hrs.		Antitoxin 0 to 6 hrs.	
	Deaths		Deaths		Deaths		Deaths	
	No.	%	No.	%	No.	%	No.	%
0 to 6 hrs. ..	2	8·0	0	0	0	0	1	1·3
6 to 12 hrs. ..	5	20·0	0	0	5	17·2	8	10·5
12 to 24 hrs. ..	5	20·0	0	0	7	24·1	5	6·6
24 to 48 hrs. ..	3	12·0	0	0	5	17·2	6	7·9
2 to 4 days ..	4	16·0	4	44·4	5	17·2	6	7·9
Over 4 days ..	2	8·0	2	22·2	1	4·5	3	4·0
Total deaths	21	84·0	6	66·7	23	80·2	29	38·2
Total cases ..	25		9		29		76	

Of 34 patients who did not receive antitoxin within 24 hours, 7 (20%) died within 12 hours of diagnosis, while of 76 who received antitoxin within 6 hours, 9 (11.8%) died within 12 hours. The proportions are not significantly different, and it is assumed that antitoxin has not already affected the fatality rate. Moreover, of the group who received no antitoxin within 24 hours more than half lived for more than 24 hours. It may be noted also that there was ample time for treatment to be given, whether or not it was effective: only 3 patients died within 6 hours of diagnosis. The group given antitoxin between 6 and 24 hours after diagnosis has not been taken into consideration, as times of administration and death were not noted exactly enough. It appears that the group treated early with antitoxin contained a fair proportion of rapidly fatal cases, and that the group not treated contained a high proportion of cases which were comparatively slowly fatal. There is therefore no evidence of a selection of the less severe cases for early treatment with antitoxin.

Fatality Rate in Various Categories

The time of diagnosis in the hospital at which treatment was carried out has been taken as the base-line in grading the time of the initial dose of antitoxin and the time of surgical intervention. Table V shows the data relevant to the effects of surgical treatment and antitoxin on the fatality rates of all the toxic cases and of two categories separated approximately according to the site of the gas gangrene as "thigh" cases (thigh, buttock, and abdomen) and other cases (leg, arm, and other sites).

TABLE V

Therapy	"Thigh" Cases			Other Cases			All Cases			
	Cases	Deaths		Cases	Deaths		Cases	Deaths		
		No.	%		No.	%		No.	%	
Surgery nil; antitoxin nil	6	6	100·0	1	1	100·0	7	7	100·0	86·8
Surgery nil; antitoxin plus	11	10	91·0	2	2	100·0	13	12	92·4	
Surgery plus; antitoxin nil	12	8	66·7	6	6	100·0	18	14	77·8	
antitoxin after 24 hrs.	2	1	33·4	4	2	50·0	6	3	50·0	45.5
antitoxin 6 to 24 hrs.	11	11	100·0	13	7	53·7	24	18	75·0	
antitoxin 0 to 6 hrs.	29	16	55·0	42	9	21·4	71	25	35·2	
Total ..	71	52	72·2	68	27	39·7	139	79	56·8	

Table VI shows the fatality rates, according to the time of amputation and the time of the initial dose of antitoxin, in the 69 patients who underwent amputation for the treatment of gas gangrene.

TABLE VI

Antitoxin Therapy	Amputation 0 to 6 hrs.			Amputation after 6 hrs.			All Cases			
	Cases	Deaths		Cases	Deaths		Cases	Deaths		
		No.	%		No.	%		No.	%	
None ..	4	3	75·0	8	7	87·5	12	10	83·4	
After 24 hrs.	0	0	0	4	1	25·0	4	1	25·0	40·4
6 to 24 hrs.	5	5	100·0	7	3	42·8	12	8	63·7	
0 to 6 hrs. ..	28	10	35·8	13	4	30·8	41	14	34·2	
Total ..	37	18	48·6	32	15	47·0	69	33	47·6	

Amputation was the first major surgical measure recorded in 64 of these cases; in 5 patients it was carried out after excision had failed to control the infection. Recurrence of gas gangrene in the stump was noted in only two patients, so that this group is substantially one in which the infection was eliminated at a definite time.

From the data in Tables V and VI the following points emerge:

Fatality Rate of Untreated Cases

There are three groups of patients who did not receive the composite treatment recommended—namely, those who had no surgical treatment and no antitoxin, those who had antitoxin but no surgical treatment, and those who had surgical treatment but no antitoxin; the fatality rate is not significantly different in the three groups. These groups comprise 29 cases, with 24 deaths, in which the site of gas gangrene involved the thigh, buttock, or abdomen; and 9 fatal cases in which the gangrene involved the leg, arm, or other sites. The mean fatality rate (87%) emphasizes the remorseless nature of the disease, and

the data—so far as they go—suggest that when treatment is lacking or inadequate the site of the infection makes no difference to the issue.

Effect of Antitoxin in Patients receiving Surgical Treatment

The mean fatality rate of all the patients who received both antitoxin and surgical treatment (Table V, last column) is 45.5%. This rate is significantly lower (41.3±9.4) than that of the mean rate of those who did not receive the combined treatment. This result would probably occur by chance less than once in 1,000 trials. A similar effect of antitoxin is seen in the group of patients in whom the spread of infection was controlled by amputation (Table VI, last column), the mean fatality rate of the treated group (40.4%) being again significantly lower than that of the group who did not receive antitoxin. It seems clear that the combined use of surgery and antitoxin was a more effective method of treatment than either of those measures alone.

Time of Administration of Antitoxin

Considering the fatality rates for all types of cases (Table V, last column), it will be seen that the decrease on treatment with antitoxin is due almost entirely to the decrease in the group treated within 6 hours of diagnosis, as the rates for patients treated later are not significantly different from those for the untreated group. In a comparison of the fatality rates of different groups of patients who all received antitoxin, the total amount of antitoxin given and the identity of the infecting organism should be taken into account, and not merely the time of the initial dose. The distribution of the total dosage given to those patients who also received surgical treatment is shown in Table VII, the patients being grouped according to the site of the infection and the time of the initial dose of antitoxin.

TABLE VII

Time of initial dose:	Group A: 0 to 6 hours				Group B: 6 to 24 hours			
Subgroup:	1		2		1		2	
Site of infection:	"Thigh" Cases		Other Cases		"Thigh" Cases		Other Cases	
Total Dose of Polyvalent Antitoxin	No.	Dths.	No.	Dths.	No.	Dths.	No.	Dths.
Units:								
Up to 20,000 ..	6	2	18	6	3	3	8	5
20,000 to 50,000 ..	12	8	12	2	6	6	4	1
50,000 to 100,000 ..	5	3	7	1	0	0	1	1
Over 100,000 ..	6	3	5	0	2	2	0	0
Total	29	16	42	9	11	11	13	7
Fatality rates ..	35·2%				75·0%			

It is not possible to draw any definite conclusion from the figures in Table VII, since, apart from the fact that the numbers are small, the necessary bacteriological data are not available. Nevertheless there are some tendencies which are of interest.

First, with an early initial dose and the same total dose of antitoxin, the fatality rate of the "thigh" cases tends to be higher than that of the other cases; if the patients are grouped as receiving up to or over 50,000 units of antitoxin the difference between the two types of case is quite significant arithmetically. MacLennan (1943b), in noting the distribution of the different sites of infection in his series of cases, gives figures which show that the mean fatality rate of all the thigh, buttock, and abdominal cases was 68%, and of all those involving the arm or leg 37.6%; these figures are closely similar to those given in Table V for the present series of cases (72.2 and 39.7%). The poorer response to treatment when the gas gangrene involves the thigh and buttock region appears to be a general experience, and it is probably attributable to the difficulties of surgical excision and to the anatomical factors affecting the blood supply of these sites.

Secondly, Table VII shows that there is a tendency for the fatality rate to be higher when a dose of a certain size—e.g., 20,000 units—was given late than when it was given early. This, of course, is consistent with both the theory and the results of experimental work—that an amount of antitoxin sufficient to neutralize all the toxin present will be effective in saving life if given at an early stage, when the damage done by the toxin is minimal, and ineffective if given later, when the damage is irreparable.

Thirdly, it will be seen that in the subgroup A2, in which all the patients received the initial dose of antitoxin within 6 hours, the fatality rate tends to fall as the total dose rises from 20,000 to 50,000 units or more. Moreover, of all the patients receiving antitoxin early (Group A), 32.4% received a total dose of more than 50,000 units of antitoxin, compared with only 12.5% of those (Group B) who received the initial dose late; it appears probable that the striking difference in the fatality rates is due not only to the fact that the one group received antitoxin more promptly than the other, but also to the fact that this group received larger doses, though, as has been said, the data are not sufficient for statistical treatment. That there is a possible fallacy in this tentative conclusion has been pointed out by Prof. M. Greenwood: thus, one cannot be certain that the fatality was lower because the larger dosage of antitoxin was given and not that the larger dosage was given because the fatality was lower—i.e., the patients in this group lived long enough to receive the larger dosage. For that reason any conclusion from these data as to the value of the high doses of antitoxin can only be provisional.

Time of Surgical Intervention

Surgical operations of a major nature were carried out within 6 hours of diagnosis in 68 of the 120 patients treated, within 12 hours in 81, and within 24 hours in 98 (81.6%). It seems clear, however, that even rapid elimination of the whole site of infection is not by itself a sufficient treatment in a toxic case; the fatality rate for patients who underwent amputation within 6 hours of diagnosis without having received antitoxin (Table VI) is not significantly different from 100%, while for those who received antitoxin within this time the rate is significantly less. Most of the patients who were treated early with antitoxin received the dose pre-operatively or at the time of operation; this is perhaps worthy of consideration, since in 11 of the 60 fatal cases in which surgical treatment was carried out death took place during or within two hours of operation.

Effect of Sulphonamide Drugs

MacLennan (1943b) showed that in his series of cases in the M.E.F. the striking reduction in the fatality rate of the group treated with antitoxin was independent of treatment with sulphonamide drugs; his figures are reproduced in Table VIII.

TABLE VIII (*From MacLennan, 1943b*)

Drug Therapy	No Antitoxin		With Antitoxin		Difference
	Cases	Deaths	Cases	Deaths	
With sulphonamides ..	28	22 (78·6%)	58	19 (32·8%)	35.8±11·5
No sulphonamides ..	19	15 (78·9%)	8	2 (25·0%)	53·9±20·3

In the present series more than 90% of the patients had received sulphonamide drugs, and the numbers untreated with drugs were so small that it was not possible to find out from the records whether the combined use of surgery, sulphonamide drugs, and antitoxin was more effective than surgery and antitoxin by themselves. It should be emphasized that several varieties of sulphonamide drugs and regimes were employed, and this necessarily complicates any attempt to assess the results. All that can be said under this heading is that the relevant data (Table IX) are not sufficient to provide significant statistical evidence of a beneficial effect of the drugs.

TABLE IX

Therapy	"Thigh" Cases		Other Cases	
	No.	Deaths	No.	Deaths
Surgery; antitoxin 0–6 hrs.:				
With sulphonamides	28	15 (53·6%)	41	8 (19·5%)
No sulphonamides	1	1 (100·0%)	1	1 (100·0%)
Surgery; antitoxin late or nil:				
With sulphonamides	23	18 (68·3%)	22	14 (63·6%)
No sulphonamides	2	2 (100·0%)	1	1 (100·0%)
No surgery; antitoxin 0–6 hrs.:				
With sulphonamides	3	2 (66·7%)	1	1 (100.0%)
No sulphonamides	1	1 (100·0%)	0	—

Effect of Complications; Serum Reactions

The opinion was recorded by the clinician in 14 reports that death was due not solely to gas gangrene but to complicating factors. After making an initial recovery, 2 patients died from secondary haemorrhage and 1 from pulmonary embolism. The

omission of these 17 cases from the appropriate categories makes no difference to the general trend of the results.

Serum reactions were noted in only 3 of the 114 patients in the series treated with antitoxin; these occurred after some hours or days in the form of a rash or pyrexia, and apparently gave no cause for anxiety.

General Remarks

The reduction of the fatality rate in the group receiving both surgical treatment and antitoxin can be reasonably held to establish the value of antitoxin in the treatment of gas gangrene. It is to be hoped that with a more effective use of antitoxin the fatality rate of 45% for treated cases will fall considerably. Speed in the administration of antitoxin is clearly essential for good results, but it is no less important that the amount of antitoxin given should be adequate for the individual case, since the neutralization of toxin by antitoxin is a quantitative reaction. It has been recently recommended (*M.R.C. War Memorandum No. 2*, revised second edition, 1943) that the initial therapeutic dose of polyvalent antitoxin should be not less than 50,000 units; the figures in Table VII indicate that, though often enough such a dose may be more than ample, it is not excessive as a routine.

The clinician still has the onus of judging quickly whether the dose given has been sufficient to neutralize all the toxin—that is to say, whether a previously rapidly progressive toxaemia has been arrested—or whether the dose of antitoxin has been insufficient and the progress of toxaemia is still acute. Delay in the neutralization of the toxin present cannot be compensated by giving an *excess* of antitoxin at a late stage; on the other hand, since the individual capacity to recover from the effects of toxaemia is incalculable, there is no justification for withholding an adequate dose of antitoxin from a patient received late for treatment, however small the chance of recovery may be. In the treatment of gas gangrene the probability should be borne in mind that the amount of toxin present in the body is increasing so long as the infection is spreading in the affected tissue. A patient received late for treatment, or one in whom surgical and chemotherapeutic measures have not been completely effective in eradicating the infection, may therefore need heroic or repeated doses of antitoxin, not because an excess has at any time a beneficial effect, but because an amount equivalent to the toxin present is the dose justifying a hope of recovery. This is entirely different from deprecating the continued administration of large doses of antitoxin to a patient in whom the infection has been controlled and the effects of the toxaemia are already vanishing.

Patients in whom the site of gas gangrene involved the thigh, buttock, or abdomen showed a poorer response to doses of antitoxin of the order recommended than those in whom the site was more favourable to the elimination of the infection both by the surgeon and by Nature. These findings support the recommendation that surgical treatment should be supplemented by chemotherapeutic measures as well as by antitoxin therapy, and point to the need for local chemotherapeutic agents more effective against clostridia than the sulphonamide drugs alone.

Summary

The value of antitoxin in the treatment of established gas gangrene has been examined in a series of 139 cases in which the patients were suffering from toxaemia to a marked degree. The fatality rate was significantly lower among the patients who received antitoxin, and this difference between treated and untreated cases persisted in those who received major surgical treatment, including a group in whom the site of primary infection was rapidly extirpated by amputation. The combined use of surgery and antitoxin was therefore more effective than that of surgery alone.

The effect of antitoxin was more pronounced in those who received the initial therapeutic dose soon after diagnosis, but this difference was probably due not only to the speed of administration but also to the fact that a greater proportion of the patients in this group received a large total dosage (50,000 units or more) of antitoxin.

The fatality rate of the patients who received no major surgical treatment was nearly 100%, and in the cases reported here the rate in this group was not reduced by antitoxin therapy. Patients in whom the site of the gas gangrene involved the thigh, buttock, or abdomen showed a poorer response to doses of antitoxin of the order recommended than those in whom the site was more favourable to the elimination of the infection.

These results emphasize the necessity for the early and combined use of surgery, effective chemotherapy, and antitoxin in the treatment of gas gangrene.

This evaluation of antitoxin in the treatment of gas gangrene has been made possible by the work of the medical officers who reported their cases, often in difficult conditions. Thanks are due to the Medical Directors-General of the three fighting Services and the E.M.S. for making the case records available for analysis. I am greatly indebted to Prof. M. Greenwood and Dr. E. Lewis-Faning for their constructive criticism and for the verification of the significance of the data; to Mr. C. H. S. Frankau for his advice on the clinical aspects; to Dr. F. H. K. Green for his help in preparing this report; and to Lieut.-Col. H. J. Bensted for much useful information. It is a pleasure also to thank Major-Gen. L. T. Poole and the members of the Anaerobic Wound Infection Subcommittee for their criticism and many illuminating discussions.

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DYSPEPSIA: AN INVESTIGATION

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The enrolment into the Forces of most of the young manhood of the country has presented us with an opportunity for statistical investigation of some of the commoner ailments. The immediate demands of warfare are so far uppermost that the clerical assistance necessary for statistical research cannot be spared. Thus little can be done towards elucidating the medical problems which in civilian life were so urgent and which we shall have to face again in the years of peace. One of the most important of these problems from a sociological and industrial standpoint is dyspepsia. In the years preceding the war the project of a research centre for gastric disorders was very much before the mind—a centre whose sole object was research into the causation of these disorders. The clinical, radiological, biochemical, and sociological data were to be collected and collated, and submitted to statistical analysis.

An opportunity of doing something along such lines presented itself at a military hospital. A scheme was devised and put into practice which had a twofold object: (1) to make some contribution to the immediate problem of dyspepsia among the troops the hospital served; (2) to furnish data for statistical research. A "gastric board" was formed consisting of the officers in charge of the medical and surgical divisions, the medical specialist, the radiologist, the pathologist, the psychiatrist, and a general-duty officer.

All dyspeptics were admitted into a 30-bed ward for investigation. None was treated there—an important point, and a partial answer to the criticism levelled against the segregation of dyspeptics. The general-duty officer examined each patient on admission, and took the history according to an agreed schedule. The whole worth of the scheme depends upon the way this part of the work is done, and it requires for its performance a medical officer of ability who is really interested in the problem. In the present instance we were fortunate in having the services of Capt. (Miss) Phoebe Charlton, who, except during brief periods of leave, was responsible for all the histories taken. Within five days of admission each patient was *x*-rayed (Major Baird; later Major Wearing), and test-meal and occult-blood examinations were done (Major Roper; later Major Stewart). The board met weekly, and saw and discussed each case, and decided upon disposal. If indicated gastroscopy was performed. Cases in

which there was no evidence of organic disease or in which there seemed to be a psychological background were sent for interview with the psychiatrist (Major Barber; later Lieut., now Major, Stungo). It was the duty of the medical specialist (Major Slot; later Major Cherniack) to examine each patient from the general standpoint, and to prevent the board from falling into the error of attributing all symptoms to the stomach or duodenum.

After 12 months, during which 436 patients were seen, the data were collected and submitted for analysis. Through the agency of Lord Dawson of Penn, Mr. W. J. Martin, of the Division of Epidemiology and Vital Statistics of the London School of Hygiene and Tropical Medicine, paid a brief visit to the hospital and took away the case sheets for analysis. The policy of having the analysis made by a disinterested and unbiased worker was deliberate. It resulted, however, in certain unforeseen disadvantages—for example, the "lumping" together of gastric and duodenal ulcers, and difficulty in interpreting the data on gastric analysis (which for this reason has been omitted from Mr. Martin's report). It is now realized that a closer liaison between clinician and statistician would have been an advantage.

For reasons of space it is not proposed to publish the actual figures furnished by the statistician, excepting one table as a specimen; we shall confine ourselves to quoting the headings and a statement of what the figures tended to show. Unfortunately, it was impossible to obtain data from a similar age group of non-dyspeptics to act as a control.

Analysis of Cases

There were 436 cases in all. These were divided into two groups —139 ulcer and 217 non-ulcer cases. The remaining 80 cases were not included in the statistical analysis: in 65 no diagnosis had been made, as evacuation interrupted investigation, and in 15 the symptoms were thought to be due to a lesion other than one affecting the stomach or duodenum.

The Ulcer Group.—We accepted the following criteria in making the diagnosis of ulcer: (1) the presence of an ulcer crater in the radiograph; (2) a typical clinical history, with high acidity and positive occult blood (even if the radiological diagnosis was doubtful or negative); (3) a previous history of perforation; (4) visual evidence at gastroscopy—this, of course, only in the case of gastric ulcer.

The Non-ulcer Group.—In this group were placed all cases complaining of dyspeptic symptoms in which there was no radiological evidence of an ulcer and in which the clinical evidence of ulcer was insufficient. Most of the cases were gastroscoped. The 217 cases are made up as follows:

No physical disease detected (functional dyspepsia)	180
Gastritis (diagnosed at gastroscopy)	23
*Duodenitis or duodenal enteritis	9
Gastro-enterostomy	3
Pyloric spasm	1
Hypersecretion and hyperchlorhydria	1

*Radiological diagnosis.

It is probable that some of the cases in the non-ulcer group actually had a duodenal ulcer. For instance, in one case an operation for perforated duodenal ulcer was performed at another hospital within a week of discharge. It is thought unlikely that many cases of ulceration were overlooked, however, though it must be admitted that the influence of pending medical boards was felt considerably, for few of them are prepared to accept a diagnosis of duodenal ulcer unless there is definite radiological evidence of it. There is no doubt that the frailties of radiological diagnosis of duodenal ulcer are not sufficiently recognized.

Findings

1. *Civilian Occupations.*—No difference in the two groups (ulcer and non-ulcer) was found relating to occupation except in the case of miners, in whom the percentage in the ulcer group was 2.9 (4 out of 139) and in the non-ulcer group 7.4 (16 out of 210). There is thus a suggestion that miners may be subject to a type of dyspepsia in which localized ulceration does not occur.

2. *Marital State.*—The incidence of both ulcer and non-ulcer dyspepsia appears to be equal in single and childless married men. Ulcer dyspepsia is, however, relatively more common than non-ulcer dyspepsia in men with two or more children. This is probably due to the fact that the mature married man is less likely to seek treatment unless he has definite cause.

3. *Rank.*—Private soldiers in the non-ulcer group numbered nearly twice those in the ulcer group (172 : 98), whereas there were rather more N.C.O.s (lance-corporals, corporals, and sergeants) with an ulcer than those without (38 : 34). There are two explanations for this: (*a*) the selection of the best types for promotion; (*b*) responsibility diminishes the tendency to report sick without adequate cause.

4. *War Service.*—One-third of the cases in each group were Regulars or Reservists and two-thirds were war enlistments. In about one-third of the cases in both groups (ulcer and non-ulcer) the symptoms began during civilian life. There is thus no evidence that Army service has any influence upon the development of non-ulcer dyspepsia as opposed to ulcer dyspepsia. This is a point of interest, for it suggests that functional dyspepsia is as common, relative to organic dyspepsia, in civilian as it is in Army life. It is possible, indeed probable, that more use is made of it in Army life in order to evade the performance of duties.

5. *Family History of Dyspepsia.*—As expected, this is common, and occurs almost equally in both groups (ulcer in 57% and non-ulcer in 54.3%).

6. *Duration of Symptoms.*—There was no difference between the two groups in the duration of symptoms, which averaged six years. Both the age at onset of symptoms and, it follows, the age when seen were earlier in the non-ulcer group.

7. *Habits.*—There were few heavy drinkers and few teetotallers —most drank beer in moderation. Likewise with smoking. The largest group was in fact composed of those who drank and smoked moderately—61.6% of the ulcer patients and 61.2% of the non-ulcer patients. This does not suggest that smoking and drinking are not a factor in the cause of dyspepsia—a comparison of non-dyspeptic cases would be of especial value here—but that whatever part these habits may play is equal in both ulcer and non-ulcer dyspepsia. In both groups two-thirds of the patients stated that their meals were regular.

8. *Symptoms.*—(*a*) *Pain in relation to food:*—The average interval between food and pain was much higher in the ulcer than in the non-ulcer group, and the presence of a considerable period of freedom after food is significant of ulceration. (*b*) *Nocturnal pain:*—This was significantly more common in the ulcer group, and emphasis is laid upon this. If the patient is awakened by pain an hour or two after falling asleep and the pain is alleviated by taking something by mouth the probability of an ulcer is high. (*c*) *Miscellaneous:*—There was no significant difference between the two groups in the following: appetite—good in 57% of ulcer and 55% of non-ulcer patients; nausea—present in 82% of ulcer and 85% of non-ulcer patients; vomiting—present in 71% of ulcer and 76% of non-ulcer patients; flatulence—present in 79% of ulcer and 82% of non-ulcer patients. It is a matter for some surprise that vomiting is so common a symptom of an uncomplicated ulcer. In most cases, however, it was only an occasional incident.

9. *Relation of Symptoms to Food and Alkalis.*—The findings here are significant, and the statistician's figures and remarks are given in full.

Reaction to Food and Alkalis

	Ulcer		Non-ulcer		Difference Ulcer/Non-ulcer
	No.	%	No.	%	
Food:					
Relieved by food ..	92	71·9	70	42·7	29·2 ± 5·9;
Not relieved ..	36	28·1	94	57·3	significant
Total ..	128		164		
Alkalis:					
Relieved by alkalis	99	77·3	101	61·6	15·7 ± 5·5;
Not relieved ..	29	22·7	63	38·4	significant
Total ..	128		164		

Difference between percentage relieved by alkalis and percentage relieved by food:

Patients with ulcers, 5·4 ± 5·4; not significant.
Patients without ulcers, 18·9 ± 5·5; significant

Distributions

	Ulcer			Non-ulcer		
	Alkalis			Alkalis		
	Relieved	Not Relieved	Total	Relieved	Not Relieved	Total
Food:						
Relieved ..	78	14	92	55	15	70
Not relieved ..	21	15	36	46	48	94
Total ..	99	29	128	101	63	164
	$\chi^2 = 8{\cdot}8756$ $P = 0{\cdot}01$			$\chi^2 = 13{\cdot}6682$ $P = 0{\cdot}01$		

Remarks by Statistician: The percentage of patients with ulcers who were relieved by food and alkalis was statistically significantly larger than in the group without ulcers. The percentage relieved by alkalis was not significantly larger than the percentage relieved by food in the group with ulcers. In the group without ulcers the percentage relieved by alkalis was significantly greater than the percentage relieved by food. The χ^2s show that there is a relation between food and alkalis; the numbers who reacted in a similar way to both food and alkalis were larger than would be the case if the reaction of food and alkalis were independent.

The findings are clear-cut:—In most ulcer cases the pain is relieved by both alkalis and food. In the non-ulcer cases food usually fails to relieve but alkalis usually do. These findings are of the greatest diagnostic importance.

10. *X-ray Diagnosis.*—It should be noted that the 9 "negative" cases of ulcer were those in which either the clinical evidence was sufficient for a diagnosis or, in cases of gastric ulcer radiologically negative, diagnosis was by gastroscopy. The two terms "duodenitis" and "duodenal enteritis" crept in because of a change of radiologist. They are, we believe, synonymous, though we put little faith in either diagnosis.

	Ulcer	Non-ulcer
Negative	9	169
Inconclusive	4	12
Ulcer	119	—
Gastritis	—	9
Hypertrophic gastritis	—	1
Gastro-enterostomy	1	2
Duodenitis	1	7
Duodenal enteritis	—	2
Deformity of stomach (external causes)	—	4
Cholecystitis	—	1
? Adenoma	1	—
Congestion	1	—
? Prepyloric ulcer	—	1
	136	208

11. *Gastroscopy and Radiography.*—The gastroscope should be regarded as complementary to radiological examination. Its chief value is in those cases in which the symptoms appear genuine but in which the radiograph is negative, and in cases in which the radiograph suggests a lesion of the stomach but is not conclusive. Twenty-three gastroscopies were done in the ulcer group and 86 in the non-ulcer group. Gastroscopy diagnosed a gastric ulcer on 3 occasions when the radiological diagnosis was in doubt. It diagnosed gastritis on 23 occasions. In these the radiograph was positive in 7 cases, doubtful in 6, and negative in 10. In 3 cases of gastro-enterostomy the radiograph showed a duodenal ulcer in 1 and a normal stoma in 2. Gastroscopy showed evidence of a stomal ulcer in 1 and of peristomal gastritis in 1, passing 1 as normal. The gastroscope is thus an invaluable addition to our means of diagnosis.

12. *Psychiatrist.*—Only selected cases were referred to the psychiatrist—2 of the ulcer group and 101 of the non-ulcer group. No abnormal psychological state was found in 36 (including one of the ulcer cases). Some evidence of a psychological background was found in the remaining 67, varying from an anxiety state (25 cases) to maladjustment to surroundings (1 case). No conclusions can be drawn from these findings without the psychiatrist's assessment of a similar numerical group with no gastric symptoms, apart from the fact that no one personality type was characteristic.

13. *Previous Operations.*—Of the ulcer cases 23 and of the non-ulcer cases 28 had had an operation upon the abdomen. Of the 23 ulcer operations 7 were for perforation. There was a very significant finding in that of the 51 cases with a history of operation 26 had been for chronic appendicitis. In each case the operation had been done to relieve the symptoms of dyspepsia. We have no means of telling how many "chronic appendices" are successfully removed for this purpose, but the present figures suggest strongly that the diagnosis of chronic appendicitis is made, and acted upon, too frequently.

14. *Disposal.*—It may be of some interest to include the following details of disposal:

Disposal of 336 Cases

	Ulcer	Non-ulcer
Returned to unit	1	116
Returned to unit after period of treatment or convalescent home	—	5
Evacuated (convalescent home or hospital) for treatment or observation	2	18
Transferred to another unit or change of duties	—	18
Prolonged period of convalescent treatment	1	—
To be kept under observation and *x*-rayed in six months' time	1	—
Category B (minor disability)	—	2
Category C (home service only)	4	29
Category E (discharged from the Army)	119	20
	128	208

Summary of Findings

Of 356 cases completely investigated 139 were regarded as having a peptic ulcer. Of these, 16 were gastric and 121 duodenal. Of the remaining 217 cases, 37 had evidence of a gastric or duodenal lesion other than ulcer; in 180 no organic lesion was found, and the condition was labelled "functional dyspepsia."

The more significant results of the statistical returns were:

(*a*) Ulcer was relatively more common than non-ulcer dyspepsia among N.C.O.s than among privates.

(*b*) There was a family history of dyspepsia in a little over half the patients in both groups.

(*c*) Duration of freedom from pain after food was longer in the ulcer than in the non-ulcer group.

(*d*) The pain is relieved by food in nearly three-quarters of the ulcer dyspepsia cases, but in less than half of the non-ulcer dyspepsias.

(*e*) True nocturnal pain, alleviated by taking something by mouth, is a more pronounced feature of ulcer dyspepsia than of non-ulcer dyspepsia.

(*f*) Gastroscopy is an invaluable aid in diagnosis.

(*g*) Of 103 patients referred to the psychiatrist (only 2 had ulcers) evidence of a psychological background was found in 65%.

(*h*) 26 of the patients had been operated upon previously for chronic appendicitis without relief from their dyspeptic symptoms.

Commentary

How did the scheme serve the two objects for which it was intended?

As a help to the immediate problem of dyspepsia in the Army, it was a success. The special features were: (*a*) The formation of a team to represent various aspects of knowledge. (*b*) Admission of patients for investigation only. They were kept on normal diet unless this was contraindicated; very few cases were treated. Investigation was carried out expeditiously and on an organized plan. (*c*) Rapid decision as to disposal. The president of the medical board in making the final decision in cases recommended as Category E was helped materially by the fusion of all the expert opinion available.

As a method of research the project is sound, but in the way it was carried out there are defects, which this experience should enable us to correct in future. The two chief lessons are: (*a*) a medical statistician should be employed; (*b*) a constant control should be kept of healthy men in similar age groups.

Our thanks are due to Col. M. J. Williamson, *M.C.*, late R.A.M.C., for permission to publish, to Lord Dawson for his interest and help, and to Mr. W. J. Martin for his masterly analysis of the data.

W. H. Gordon, F. B. Parker, jun., and S. Weiss (*Arch. intern. Med.*, 1942, **70**, 396) record their observations on three cases of gummatous aortitis in patients aged from 35 to 42. In the first case the gummatous process completely occluded the right coronary artery and partially occluded the left one. In the second, gummatous lesions were present also at the base of the aortic valve; and in the third an extensive gummatous process affected not only the aorta but the pulmonary artery. Symptoms of gummatous aortitis such as dyspnoea, orthopnoea, precordial distress, cardiac asthma, pulmonary oedema, and haemoptysis are present only where there is narrowing or occlusion of the coronary arteries.

THE BACTERIOLOGY OF BRAIN ABSCESS

BY

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This paper reports the bacteriological findings in 48 cases of brain abscess which had been referred to neurosurgical clinics. I am indebted to the surgeons of seven such clinics for sending specimens of pus and for providing data about their patients.

Details of the Cases

Sex and Age.—Of the 48 patients, 36 were male and 12 female. The ages of three were not stated; the ages of the remaining 45 ranged from 5 to 53 years, and the numbers in successive decades were 4, 8, 11, 13, 7, 2.

Site of Abscess.—Forty-two patients had a single abscess, 6 had more than one. The right side of the brain was affected in 27 cases, the left in 19, and both right and left sides in 2. Of the single abscesses 3 were cerebellar, 18 were in the frontal lobe, 5 in the parietal lobe, 15 in the temporal lobe, and 1 in the occipital lobe. In 3 cases abscesses were present in the frontal and parietal lobes, in 1 case in the frontal and temporal lobes, and in 2 cases in the temporal lobe and cerebellum.

Probable Source of Infection.—Ear disease was considered to be the source of infection in 18 cases, sinusitis in 7, lung disease in 7, trauma (penetrating injury) in 3. Staphylococcal septicaemia, subacute bacterial endocarditis, and puerperal sepsis each provided one case. In 4 cases the source of infection was unknown.

Clinical Course.—The duration of abscess symptoms was known in 47 cases; in 15 it was less than one month at the time of admission, in 22 it was between one and three months, in 6 between four and seven months, and in 4 a year or more. Information about capsule formation was available for 39 cases. In 16 of them encapsulation was demonstrated histologically. In 7 of these cases and in 18 others a definite tough or firm wall was noted at operation. Clinical observations indicated the absence of a capsule in 3 cases, and histological observations in 2 other cases. Of the 48 patients 20 were discharged from hospital—13 of them classified as " cured " or " recovered," and 7 as " improved." Four were " under treatment " at the time of the last report. Twenty-four died in hospital. In 19 of the fatal cases death resulted from the brain abscess. In 4 cases (2 of septicaemia and 2 of pulmonary infection) death was due primarily to the condition from which the brain abscess originated. In 1 case in which death was due to pulmonary embolism two healed abscesses were found in the brain at necropsy.

Technique and Results

Films of the pus were stained by Gram and Ziehl-Neelsen methods. In all cases aerobic and anaerobic cultures were made on horse-blood agar plates and in ox-serum broth. When examination suggested the need for enriched or selective media, Fildes's agar, 20% ox-serum agar, or horse-blood agar with crystal violet (1 in 500,000) or sodium azide (1 in 1,000) were used

TABLE I.—*Organisms found in 48 Brain Abscesses. (The Pus from One Abscess showed no Organisms in Films and Cultures were Sterile)*

	Number of Times Each Organism Appeared		
	In Pure Culture (33 Cases)	With Other Organisms (14 Cases)	Total (47 Cases)
Staph. aureus	13	2	15
Strep. pneumoniae	6	—	6
P. vulgaris	2	4	6
Strep. pyogenes	4	—	4
Strep. viridans	1	1	2
Non-haemolytic streptococci	2	—	2
Anaerobic streptococci	1	9	10
Unclassified streptococci	—	3*	3
Fusiform bacilli	2	8†	10
M. tetragenus	1	—	1
Anaerobic diphtheroids	—	2	2
H. influenzae	1*	—	1
Total number of organisms	33	29	62

* Seen in films only.
† Two strains of fusiform bacilli were seen in films only.

Examination of films and cultures showed in 33 cases a single bacterial species (Table I), in 14 cases more than one species (Table II), and in one case no organisms. It is unlikely that delay in the post was responsible for any errors in the results recorded here, as many were identical with those obtained at the clinic concerned. From some abscesses several specimens were examined and the same organisms found on each occasion. Only in one traumatic abscess due to *Strep. pyogenes* did later specimens prove sterile. In studying the organisms the following points were noted.

TABLE II.—*Combinations of Organisms found in 14 Cases*

	Cases
Fusiform bacilli and anaerobic streptococci	3
" " " Strep. viridans	1
" " " unclassified streptococci	3
P. vulgaris and anaerobic streptococci	4
Anaerobic streptococci and anaerobic diphtheroids	1
Staph. aureus and anaerobic diphtheroids	1
" " anaerobic streptococci, and fusiform bacilli	1

Staph. aureus.—All 15 strains were coagulase-positive.

Strep. pneumoniae.—All 6 strains were bile-soluble. Three were Type III, two Type VII, and one Type XXI. The three Type III strains and the Type XXI strain grew only anaerobically in primary cultures.

Strep. pyogenes.—All four Group A strains were tested with Griffith's sera. One was not typed, one was Type 8, one Type 5, and one Type 2.

Strep. viridans.—The single strain gave α-lysis on horse-blood agar, was not bile-soluble, and produced no soluble haemolysin.

Non-haemolytic Streptococci.—Two strains produced no lysis on horse-blood plates and no soluble haemolysin. In primary cultures growth was more profuse anaerobically than aerobically.

Anaerobic Streptococci.—Seven strains grew on horse-blood agar as pin-point colonies after 24 or 48 hours' anaerobic incubation. No growth was obtained aerobically with liberal inocula on blood agar or in serum broth. Four of these seven strains gave no precipitation with Group A, C, or G sera. Three other strains produced small coal-black colonies on horse-blood agar after 5 days' incubation. They were apparently similar in this respect to strains isolated by Colebrook and Hare (1933) from cases of puerperal fever.

Fusiform Bacilli.—These organisms appeared in pus films as slender fusiform or diphtheroid Gram-negative bacilli. Films from cultures showed slender, beaded, Gram-negative bacilli, with some cocco-bacilli and filaments. Some strains showed many " ghost forms " and irregular swellings. No growth was obtained aerobically. No spores were seen. Three strains were killed by heating at 60° C. for 30 minutes. The colonies on horse-blood agar plates after two days' anaerobic incubation were in most cases 1 mm. in diameter, round, smooth, and low convex; but a few strains had colonies of 2 to 3 mm. diameter with a rough surface and slightly irregular edge. In serum sugars two strains produced acid and gas, and one strain acid only, in glucose, maltose, lactose, and sucrose. Mannitol and salicin were not fermented. It seemed justifiable to place these organisms in the *Fusiformis* group, but not to assign them to any particular species in it, because individual strains showed some characteristics of *F. fusiformis* and some of *F. necrophorus* (Topley and Wilson, 1937; Dack, 1940).

Anaerobic Diphtheroids.—Two strains of slender Gram-positive bacilli seen in pus films grew only anaerobically. On horse-blood agar after two days' anaerobic incubation the colonies of one strain were 1 mm. in diameter, round, smooth, and convex; the colonies of the other were 2 mm. in diameter, irregularly circular, rough, flat, and sunken in the agar. Films from cultures showed Gram-positive diphtheroid bacilli. No acid was produced in glucose, maltose, sucrose, or starch serum sugars.

Micrococcus tetragenus.—An abundant growth of this organism was obtained from one specimen of pus which showed clusters of Gram-positive cocci in films. A similar result was obtained in another laboratory which had isolated *Strep. pyogenes* and *Staph. aureus* from specimens taken some months earlier when the abscess was first aspirated. The specimens from which *M. tetragenus* was isolated were obtained at the first aspiration of a recurrence.

Some of the strains isolated were used for the production of experimental brain abscesses in rabbits (Falconer, McFarlan, and Russell, 1943).

The Commonest Organism in Brain Abscess

A comparison of the clinical data of cases collected by other authors (Evans, 1931; Atkinson, 1934) with those studied here showed that this series, though small, is a representative one. Analysis of the bacteriological findings in this series revealed no close association between the type of organism and the site of abscess or source of infection, so that the data as they stand are a fair sample for use in estimating the frequency with which various organisms are found in brain abscesses that are referred to neurosurgical clinics. Rapidly fatal cases which do not reach the neurosurgeon might give different results.

Staphylococcus aureus was isolated from 15 of 48 cases. The age distribution of 11 of the cases from which *Staph. aureus* was isolated in pure culture was 1, 2, 3, 1, 4, 1 in successive decades. Thus the organism occurred in roughly one-third of the whole series and of each age group. " Streptococci " were seen in films or

* A report to the Medical Research Council.

isolated from 21 cases, but culture showed 10 strains to be anaerobic streptococci, 4 to be *Strep. pyogenes*, 2 *Strep. viridans*, and 2 non-haemolytic streptococci. Three strains were seen only in films. Thus, although "streptococci" were common, several species were represented. Fusiform bacilli were found in 10 cases; in 7 of these they were accompanied by streptococci of one species or another, and in one case by both streptococci and staphylococci.

The commonest organism, therefore, was *Staph. aureus*. Fusiform bacilli and anaerobic streptococci came next in order of frequency. *Strep. pneumoniae*, *P. vulgaris*, and *Strep. pyogenes* were also found in several cases.

Discussion

Although staphylococci were present in 15 of the 48 cases in this series and in 14 of 27 cases reported by Alpers (1939), other authors (Hasslauer, 1907; Lund, 1926; Atkinson, 1934) found them in only a few of their cases of brain abscess. It is difficult to account for this discrepancy. The predominance of staphylococci in the present series was not due to the inclusion of cases in infants, in which staphylococci are said to be very common (Sandford, 1928). Several authors have stated that streptococci are the commonest organisms, but the results of culture in this series suggest that several species of streptococci may have been represented. It is unjustifiable to group these species together and misleading to state that streptococci are the commonest organisms in brain abscess. Fusiform bacilli and anaerobic streptococci were often found, and on several occasions pneumococci grew only anaerobically in primary cultures. It is clear that anaerobic culture is an essential part of the examination of pus from brain abscesses.

It appears from Table I that more than one species of organism was present in a large proportion of the abscesses from which anaerobic organisms were isolated. Wámoscher and von Vásárhelyi (1933) showed that the injection of agar furnished a nidus in which tetanus spores could germinate, and it is possible that the use of agar in the inoculum was responsible for the production of abscesses in rabbits' brains with anaerobic streptococci and fusiform bacilli by Falconer *et al.* (1943). It seems therefore quite probable that brain abscesses due to anaerobic organisms originate in foci of lowered O-R potential (Fildes, 1927) produced by a vascular accident or by aerobic organisms which later die out.

In this series clinical evidence of encapsulation was obtained in 5 cases two months after the onset of symptoms, and in 8 cases with three months' history. Histological examination showed well-marked fibrous walls in 2 (pneumococcal) cases with six weeks' history, in 3 cases with two months' history, and in 6 cases with three months' history. However, the clinical observations concerned the superficial part of the abscess wall, where encapsulation is more rapid than in the parts nearer the ventricle (Northfield, 1942; Falconer *et al.*, 1943). Moreover, a deeper unencapsulated loculus was present in several abscesses which had apparently been present for six months or longer. It was therefore impossible to draw any general conclusion about the time relations of capsule formation or to compare the speed of encapsulation of abscesses due to different organisms.

Of the two cases without a capsule, one in which cerebral symptoms had been present for a week was due to anaerobic streptococci, and the other, in which symptoms had been present for a fortnight, was due to *Strep. pyogenes*. It is clear that no deductions as to delay in capsule formation should be drawn from these two presumably recent abscesses. The same argument applies to the three abscesses in which the absence of a capsule was noted at operation. One of these with a fortnight's history was due to *P. vulgaris* and anaerobic streptococci, one with a three-weeks history to fusiform bacilli and anaerobic streptococci, and one with a four-weeks history to *Staph. aureus*.

There are repeated statements in the literature (Neumann, 1909; Alpers, 1939; Grant, 1941) that anaerobic and Gram-negative bacilli inhibit capsule formation. Histological examination demonstrated well-formed collagenous capsules in two cases in this series from which fusiform bacilli were isolated (in one case together with anaerobic streptococci and in the other with streptococci seen only in films). One of these cases has already been cited by Falconer *et al.* (1943), who found that encapsulation occurred in brain abscesses caused by the intracerebral inoculation of fusiform bacilli or anaerobic streptococci in rabbits. There is therefore both clinical and experimental evidence that encapsulation does occur in the presence of fusiform bacilli or anaerobic streptococci. Similarly the authors just cited showed that encapsulation occurred in experimental abscesses due to *P. vulgaris*, and well-formed capsules were found in two abscesses in this series in which *P. vulgaris* was present. These observations agree with Atkinson's (1934) statement that *P. vulgaris* is apparently not highly virulent in brain abscesses, but do not support the statement, probably derived from Lund's (1926) record of twelve fatal cases due to coliform bacilli, that Gram-negative bacilli inhibit capsule formation. Thorotrast, which favours encapsulation (Falconer *et al.*, 1943), had not been introduced into the abscesses considered here.

Summary

Specimens of pus from 48 brain abscesses were examined. Details of the cases, of the bacteriological technique, and of the organisms isolated are set out. Of the cases 33 yielded a single organism and 14 more than one species of organism. One specimen was sterile.

Staph. aureus was present in 15 cases, fusiform bacilli and anaerobic streptococci each in 10 cases. *Strep. pneumoniae*, *P. vulgaris*, and *Strep. pyogenes* each appeared in several cases. "Streptococci" were found in 21 cases, but several species were represented, and the statement that streptococci are the commonest organisms in brain abscess is misleading.

Anaerobic culture is a necessary part of the examination of pus from brain abscesses both for the isolation of obligate anaerobes and for the isolation of some strains of pneumococci.

Data concerning the encapsulation of the abscesses were not sufficient to permit any general conclusions about the rate at which the capsule is formed or the effect on that rate of the species of the infecting organism. Two abscesses from which fusiform bacilli were isolated were shown histologically to be well encapsulated, as were two abscesses from which *P. vulgaris* was isolated. These cases and some experimental studies (Falconer *et al.*, 1943) are at variance with the statement that anaerobic and Gram-negative bacilli inhibit capsule formation.

I wish to thank Dr. Dorothy S. Russell for allowing me to use her histological findings in the discussion of capsule formation, and the neurosurgeons, particularly Brig. Cairns, without whose help the study could not have been undertaken.

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ON THE HANDLING OF SMALL BIOPSY MATERIAL

BY

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The increasing frequency of diagnostic biopsy, especially of the epithelium of the uterus and the respiratory tract, has prompted this description of the technical procedures used in this laboratory. First, however, it is important to state that biopsy material removed with a blunt scalpel or curette, or subjected to squeezing, tearing, crushing, or deep coagulation during removal will, no matter how good the technique of the pathologist, show nuclear changes that are characteristic of intravital trauma; it should be more widely known that these changes may make the difficulties of histological diagnosis insurmountable.

Many of the methods to be described are of long usage, and are due to predecessors or colleagues; a few are personal innovations, but all have formed an established and satisfactory routine for several years. The importance of scrupulous technique in the handling of such delicate material can scarcely be over-

emphasized, and the description and recommendations are therefore given in a somewhat dogmatic tone.

Fixation

The fixative used exclusively is formol-corrosive. This is prepared by adding 10 parts of commercial formalin (not neutralized) to 90 parts of saturated aqueous solution (5.6%) of mercuric chloride; to this is added enough saturated aqueous magenta acid (acid fuchsin) to give a pale pink colour (depth of 1 in 20,000 $KMnO_4$). This mixture keeps satisfactorily for months. The addition of the dye has the advantage not only of distinguishing the solution in the laboratory but of imparting to the small fixed fragments a very visible and so helpful red colour. The fixative is supplied in 4-oz. wide-mouthed bottles with bakelite screw caps, about three-quarters full. Metal caps must not be used. The tissues are dropped direct into the fixative, although with endometrial curettings it is of proved value to follow the method employed by Dr. Adam Barr, gynaecologist to this hospital. The curettings are dropped on to an adjacent sterile towel, and the theatre sister, with clean forceps, immediately transfers the fragments of tissue into the fixative. Fixation should be for eight or more hours; in practice this means until the following morning. The tissue is then transferred direct to 95% ethanol (methylated spirit) in a 4-oz. wide-mouthed glass-stoppered specimen jar, where it lies till evening.

Dehydration is completed by transfer to "absolute spirit" (industrial methylated spirit 74 degrees overproof) or absolute ethanol, in which the tissue lies until the morning of the next day (second day after biopsy). *Clearing* is done by benzol (commercial 90%), into which the tissue is now put; two hours is usually enough. Thanks to the fuchsin the cleared tissue is still easily visible—an important point. *Paraffin impregnation* follows, and at 54° C. is adequate in three to six hours (depending on the size and consistency of the tissue). The tissues are thus ready for cutting by the evening of the second day after operation; in practice they are usually cut and stained the following morning.

Notes and Comments

The use of a fixative containing mercuric chloride holds the fragments together by the rapid coagulative effect, and gives a much better fixation of nuclei than fixing for the same period in ordinary formol-saline. The absence of a chrome salt (as in Zenker's solution) removes the need for washing out the fixative, while the presence of formalin in the mixture produces a better fixative for diagnostic purposes than plain aqueous corrosive sublimate (Lendrum, 1941a). It is of course necessary to remove the corrosive by treating the sections with iodine during their hydration before staining.

The fixative thus used is generally quite suitable for filtering and subsequent re-use in fixation of the more gross surgical tissues; the bottles are scrupulously cleaned before refilling with fresh fixative.

In handling small bits of tissue it is of great help to use, as Dr. Janet Niven suggested, dental plugging forceps rather than the usual tissue forceps; they certainly add a noticeable delicacy to the touch.

Denser and tougher tissues (such as biopsies of skin) can be subjected to the same routine if the pieces are small. If, however, a piece is thought to be too large one can cut it with a sharp knife after eight or more hours' fixation, knowing that the face thus cut, thanks to the coagulative power of the corrosive, is not likely to distort. In practice the larger fragment of tissue is left uncut until the next morning; it is then bisected (e.g., through a suspected ulcer), returned to the fixative till midday, then transferred to 95% ethanol, and in the evening to the "absolute spirit" as usual.

If an unsuspected toughness or hardness in a tissue is discovered only when the block is being cut on the microtome, the following procedure is used. The mixture called "mollifex" (B.D.H.; see Baker, 1941) has the power of softening tissue in a paraffin block. In practice if such a troublesome tissue is encountered the paraffin block, still on its wooden chuck (see Carson, 1941), with the tissue already exposed by the attempted cutting, is immersed in mollifex for three or four hours (or till the next day), and it is then found that a satisfactory section can usually be cut. Glycerin has a similar but slower action. If unsuspected calcification is revealed at the stage of cutting, the block and chuck are immersed in a modified Ebner's decalcifying solution (6% mercuric chloride in 15% sodium chloride, with 1% of hydrochloric acid), and by the following day it is usually possible to obtain a satisfactory section. Slightly longer staining with haematoxylin is necessary because of the acidity of the tissue.

Lymph nodes present a particularly difficult problem, and, since diagnosis of the reticuloses is so dependent on perfect histology, they should be treated by a slower method of dehydration (Lendrum, 1941b).

Summary

Satisfactory diagnosis of biopsy material demands good technique on the part of surgeon or gynaecologist and of the pathologist.

The routine as used at the Western Infirmary Laboratory is described in detail, and recommended as being capable of giving consistently good results.

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Medical Memoranda

Congenital Atresia of the Oesophagus

In recording a case of congenital atresia of the oesophagus in the *Journal* (Nov. 12, 1938, p. 983) J. W. D. Bull says: "The following case is recorded not on account of its rarity but because the condition has been so seldom mentioned in the English literature." For the same reason it may be worth while to record another case, in which the fistulous tract opened at the extreme end of the trachea between the bronchi, thus differing from Dr. Bull's case, in which the opening was a little way up on the posterior wall.

Clinical History of Case

The mother attended ante-natal clinics and was confined at this hospital. She was a primigravida aged 33. As in Dr. Bull's case, hydramnios had been noted. Apart from premature rupture of the membranes labour was normal. A female child was born on March 17, 1943, at about 35 weeks' gestation. She weighed 4 lb., measured 17¼ in., and was apparently healthy. The following night the child vomited thick mucoid material. Cyanosis and rapid shallow respirations were noted. Oxygen, brandy, and glucose were given, but it was found that the child seemed better when left alone. Next day the vomiting continued and fluid was regurgitated through the nose. Cyanosis occurred after each feed and disappeared when the vomiting ceased. Inspection of the palate showed no abnormality, and tracheo-oesophageal fistula was tentatively diagnosed. Feedings were stopped and rectal and subcutaneous glucose-salines substituted. Later the same day frothy white material was ejected from nose and mouth, during which cyanosis persisted. Meconium was passed per rectum. The following day the condition was similar, and the child died early next morning—i.e., after three days.

Photograph of specimen

Post-mortem Examination.—Since the essential points are shown in the photograph, it will suffice to say that no other abnormality was discovered and to describe the procedure. After removal of the thoracic and abdominal viscera in one piece, a metal catheter was passed into the oesophagus from above and was arrested after about 1½ in. The oesophagus was opened on to the catheter and found to end blindly. After opening the stomach the catheter was passed up the oesophagus from below. It passed quite readily and emerged from the larynx. Cutting down on to the catheter showed that the lower part of the oesophagus entered the trachea at its bifurcation. There was no evidence of bronchopneumonia, which is apparently the usual cause of death in such cases.

The specimen is now in the Teratological Section of the Museum of the Royal College of Surgeons. In the accompanying photograph the highest pin impales the epiglottis. The metal stylet lies in the trachea and shows the fistula proceeding from the trachea and opening into the stomach. The blind sac of the upper part of the oesophagus is opened and pinned out. The trachea and bronchi are shown opened.

I am indebted to Dr. J. Laurie, medical superintendent, for permission to publish the case, and to Mr. Beggs, clerk of the hospital, who kindly took the photograph.

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Ether Clonus treated by Hexobarbitone Soluble

The following case may be considered of sufficient general interest to be recorded.

An obese woman aged 47 was admitted with an acute appendix. Anaesthesia was induced with gas–oxygen–ether given through a standard Boyle apparatus. Induction was uneventful, but just as the surgeon had opened the peritoneum contractions began abruptly and, so far as could be judged, throughout the whole body simultaneously. The anaesthetic was withdrawn at once, and pure oxygen given under as much pressure as was possible with the apparatus being used. The contractions continued with extreme violence and did not permit of a single complete inspiration. Cyanosis rapidly became extreme; 0.5 g. of hexobarbitone soluble (evipan sodium) was dissolved in 5 c.cm. of distilled water and administered intravenously. No more than 1 c.cm. of the solution had been given when the clonus ceased abruptly. The remainder of the solution was slowly injected and the operation was completed without difficulty. No more anaesthetic was required.

It may be noted that: (1) It is very difficult to enter even a good vein when clonus is present, and almost impossible to be sure of not spilling the solution into the surrounding tissues. (2) Induction required a rather large amount of ether, the appendix was gangrenous, and the theatre unusually hot owing to black-out conditions.

Evesham General Hospital. H. L. HEATH, M.B., Ch.B.

Unusual Cases of Diphtheria

In view of the recent note by Dr. Manuel Anderson (*Journal*, July 24, p. 104) on an unusual case of external diphtheritic membrane the following cases seem worthy of record.

CASE I

A boy aged 4 years was admitted to this hospital on Dec. 14, 1940, from the Royal Liverpool Children's Hospital, with large patches of diphtheritic membrane on both tonsils. He had been given 10,000 units of antidiphtheria serum before admission, the throat swab being positive. Shortly before developing the faucial diphtheria he had had a second-stage Edmund's operation for hypospadias.

On admission it was observed that the glans penis was very oedematous and that there was a yellowish membrane covering it, blackening in the area of the corona. Cultures taken from this were positive for the Klebs-Loeffler bacillus. A further 40,000 units of A.D.S. was given; the whole penile slough thickened and blackened, and was removed with hydrogen peroxide. The general condition rapidly improved. On Jan. 6, 1941, swabs were taken; the throat proved negative, but the penis positive, as it was again one week later. There were two catgut sutures in the region of the corona; these were removed, and on Jan. 16 a negative swab was obtained.

CASE II

On Jan. 29, 1941, a woman aged 25, with her child aged 5 weeks, was admitted to hospital. The mother had faucial diphtheria with a large patch of membrane on the left tonsillar area A swab was positive. The course of her case was normal, although in view of her feeding the baby I swabbed the nipples, which were negative for K.L.B.

The child was the interesting case. Before admission there had been a nasal discharge and epistaxis, and the nasal swab was positive for K.L.B. Three weeks previously the child had been circumcised, and there was a filmy membrane on the glans penis and also on the umbilicus, which was still moist. Cultures from both these areas were positive for K.L.B. The throat was negative. 16,000 units of A.D.S. was given. On Jan. 31 there was still some nose-bleeding, but the umbilicus was drying rapidly, forming a blackish scar. The condition of the penis was much the same. On Feb. 3 the black scar had dried and lifted off, leaving a clean healed area. On Feb. 14 small blisters appeared on the penis, but these were negative for K.L.B. and soon cleared up. The mother and child were discharged on March 1, 1941, with swabs from all areas negative.

COMMENT

As in Dr. Anderson's case, undoubtedly the "raw" areas were ready to be "inoculated" with K.L.B. In these cases trauma was not slight, however; but perhaps the cases bear out the suggestion that trauma plays some part in the introduction of the Klebs-Loeffler bacillus.

I should like to thank Dr. Hillman Gray for access to the records.

JOHN W. CROWTHER, M.B., Ch.B.,
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Reviews

EXAMINATION OF THE CHEST

Chest Examination: The Correlation of Physical and X-ray Findings in Diseases of the Lung By Richard R. Trail, M.D., F.R.C.P. With a foreword by Sir Walter Langdon-Brown, M.D., F.R.C.P. (Pp. 107; illustrated. 10s. 6d.) London: J. and A. Churchill. 1943.

Wing Cmdr. Trail has written the little book which many of his colleagues have thought of writing but have hitherto shirked the task. Its main purpose is to correlate the anatomy and pathology of the lungs with the physical findings—clinical and radiological. The book contains four sections. The first consists of a very useful summary of the static and dynamic anatomy of the lungs, including the normal radiological appearance. The second and main section correlates the abnormal physical and radiological findings in common chest diseases with the pathology. This is well done, and the section contains much information not readily accessible to students. Wing Cmdr. Trail is very dogmatic, as is essential when writing for students, but many of the statements concerning the deductions which can be drawn from physical signs are by no means generally accepted. It is a pity that these were included, because many of the less orthodox claims could have been omitted without loss to the general clarity of his explanations. The two sections containing notes on physical signs and on reading films of abnormal chest conditions bear evidence of their origin in lecture notes, as the author explains in the preface. The former gives many useful hints, but the subsection "Crepitations" will not clear the muddle which exists in many students' minds when classifying adventitious sounds. The section on reading *x*-ray films suffers from its brevity and from insufficient diagrams and reproduction of the conditions described, but internal evidence in the text suggests that this is the fault of the publishers rather than the author.

A small volume on these subjects was needed badly, and students will learn much from the careful study of the book. Readers must, however, realize that some of the explanations are useful hypotheses rather than proven facts, and not be discouraged if they fail to obtain as much information as the author does from the physical examination of the patient.

PHYSIOLOGICAL BASIS OF MEDICINE

The Physiological Basis of Medical Practice. By Charles Herbert Best, M.D., D.Sc., F.R.S., F.R.C.P., and Norman Burke Taylor, M.D., F.R.C.S.Ed. Third edition. (Pp. 1,942; illustrated. 55s.) London: Baillière, Tindall and Cox. 1943.

We welcomed the second edition of this valuable book after its appearance in 1939, since when it has been reprinted three times. Now that a third edition appears we need only repeat our praise, for with one exception the book stands much the same, though there has been revision of detail throughout. The exception is the contribution of Dr. A. M. Wynne on intracellular respiration, which has been entirely rewritten. This is a subject of such growing importance in biochemistry that a brief review of its complexities may be of interest. Intracellular oxidation is primarily concerned with liberation of free energy in the living cell. It is not true, as used to be said, that "all life depends on oxygen," if that statement is read as it stands, for certain organisms and anaerobic bacteria can obtain energy in the complete absence of oxygen by rearranging the atoms in, for example, glucose. In all fermentations there is a cleavage of the molecule, the oxidation of one half being achieved by the reduction of the other half. Even in animal tissues there is an anaerobic mechanism for the liberation of energy. In muscle this comes into play when there is an acute need for energy which the oxygen supply is inadequate to meet. On the other hand, when the oxygen supply is abundant it suppresses the fermentative method. The utilization of intracellular oxygen was studied by Warburg, who revived interest in the muscle pigments detected by McMunn as long ago as 1886, which were subsequently found to be iron-porphyrin compounds. But Warburg's conception of this as a "respiration enzyme" was inadequate to explain the observed facts. Keilin renamed the pigments cytochromes, of which there are three—a, b, and c. He showed that in whatever way oxidation was effected it involved the loss of one or more electrons, which were regained on reduction. Intracellular

oxidation is achieved by handing on an electron from the iron in one cytochrome to the next in the series, thus becoming oxidized itself and reducing its neighbour by means of the gift thus received. Such in barest outline is the remarkable story.

The book is a valuable work of reference, but, as we said before, the particular need now is for books on the principles of physiology and medicine side by side with such admirable encyclopaedias.

PROBLEMS OF POST-WAR EUROPE

When Hostilities Cease. (Pp. 124. 4s. 6d.) London: Victor Gollancz. 1943.

This booklet contains papers on post-war relief and reconstruction that were written for the Fabian Society. Julian Huxley writes on relief and reconstruction, H. J. Laski on the machinery of international relief, W. Arnold-Foster on international controls, John Marrack on food for starving Europe, Aleck Bourne on post-war medical relief in Europe, John Hammond on relief measures for agriculture, and Kenneth G. Brooks on the re-establishment of displaced peoples. Leonard Woolf contributes the introduction, and there is a foreword by Philip Noel-Baker. The introduction states, "The citizen who has read this book cannot evade responsibility by the plea of ignorance, for he knows the facts, the problem, and the policy of action which the Government of his country should adopt. It remains, therefore, for him to see that his Government adopts it." Such an *ex cathedra* utterance is unfortunate; it is certainly an over-simplification. The reader will find stimulating accounts of numerous aspects of some of the most urgent and difficult problems of post-war Europe, but some of the views expressed are unlikely to secure universal approbation. There are, indeed, divergencies of opinion among the authors of this book; it would be surprising if it were not so. There is, however, general agreement that post-war relief should be much more than a mere salvage operation or an act of charity. Relief must be a prelude to reconstruction; it should be the first step in practical international economic co-operation, and the machinery for its control should be, or should develop into, an integral part of the future international organization. It is very desirable, then, that relief and reconstruction should be planned and administered with due regard to the structure and attributes of the future "League of Nations." Some international controls will be essential as soon as hostilities cease, and in many fields such controls must be permanent and more effective than any that the League of Nations was ever able to secure. The political failure of the League has overshadowed the very solid achievements of some of its technical organizations—such as the International Labour Office and the Economic and Health Sections. In the fields of public health and medical research the League's Health Organization, with certain modifications and readjustments, might make a very valuable contribution to post-war relief and reconstruction. In any case the medical profession will have a vitally important part to play in the rehabilitation of this war-stricken world, and for that reason, if for no other, the subject-matter of *When Hostilities Cease* is of immediate concern to it.

In describing the magnitude and scope of the post-war catastrophic conditions that will call for relief much is inevitably based on conjecture and on analogy with conditions after the last war. The book is not altogether free from errors. Thus in the chapter which deals with food for starving Europe it is stated that "the number of cattle in Germany fell from 20,994 in 1913 to 17,227 in 1918." These are impossibly low figures. Elsewhere in the book the probable deficiency in numbers of cattle in Europe, excluding Russian losses, is given as 10,000,000 head.

Notes on Books

The Governors of the Royal Cancer Hospital, London, have authorized the republication of selected papers from that hospital and the associated Chester Beatty Research Institute. The first volume appeared at the end of last year and was briefly noticed in this column on April 10. Volume 2 has now been issued. Like its predecessor, it is a substantial book, and it comprises 34 papers published during 1939 and 1940. All the articles are well reproduced by the Replika process, and they cover a wide range of subjects related to cancer, its genesis and treatment. By far the longest contribution is an important paper by Prof. J. W. Cook and Prof. E. L. Kennaway entitled "Chemical Compounds as Carcinogenic Agents: second supplementary report: literature of 1938 and 1939," reprinted from the *American Journal of Cancer*; this occupies some 90 pages. Copies of Volume 2 are available at a cost of 16s. post free and may be had on application to the Secretary, Royal Cancer Hospital (Free), Fulham Road, London, S.W.3.

A fifth edition of *A Guide to Anatomy*, by E. D. EWART, has now been published by H. K. Lewis at 17s. 6d. Written originally in 1920, this book has proved useful to a long succession of students preparing for the examinations held by the Chartered Society of Massage and Medical Gymnastics, and it has grown much with the passage of years. Dame Barrie Lambert, who helped the author with the first draft, writes a foreword to the new edition.

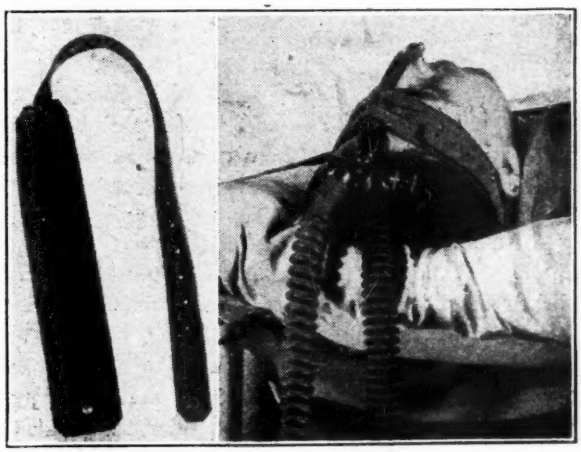
Eight Hundred Years of Service: The Story of Britain's Voluntary Hospitals is the title of a neat and attractive pamphlet issued by the British Hospitals Association (12, Grosvenor Crescent, S.W.1). The spirit of hospital service, and a good many of its details too, could not have been more pithily set out in fewer than a score of pages. The title, perhaps, is open to a little question. It is true that St. Bartholomew's has had more than eight hundred years of history, but, apart from that great foundation and St. Thomas's, the story of hospitals so far as London is concerned, and most of the English counties as well, is a very thin one until the beginning of the eighteenth century. The pamphlet does not attempt any definition of what "voluntaryism" means, but it describes in a terse fashion the triumph of planning which a modern hospital represents, and the humanity of its administration, with a brief account of the great medical discoveries and achievements that have taken place within its walls. The object is to show the general public how voluntary hospitals can take a major part in the coming co-ordination of hospital services.

Preparations and Appliances

AN ENDOTRACHEAL HARNESS

Dr. M. W. P. HUDSON writes from Queen Mary's Hospital, Roehampton:

The device shown in the illustrations is designed to prevent the drag of the accordion tubing on the nose and to avoid separation of this from the endotracheal tube during anaesthesia. It consists essentially of a rubber band three inches wide and ten inches long with a tail-piece sixteen inches long. The centre portion has two parallel slots through which the junction tubing is threaded: at one end there is a stud; at the other end the tail-piece has a series of holes.



The main portion is laid on the forehead and the junction tubing is threaded through the slots: the tail-piece is then passed immediately above the ear, behind the head below the occiput, and immediately above the ear on the other side. Tension is adjusted as required and the tail-piece is fixed by pressing the appropriate hole on to the stud.

It will be noted from the figure that no movement can occur between the nose and the point of fixation however much the position of the head is altered during an operation.

I wish to thank the Director-General of Medical Services, Ministry of Pensions, for permission to publish this note, Mr. T. P. Kilner for his encouragement, and Mr. J. E. L. Mayes for the photographs. The harness can be obtained from Medical and Industrial Equipment, Ltd., 12, New Cavendish Street, London, W.1.

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MEDICINE AND SOCIETY

If civilization means the art of living together in towns we cannot yet be sure that our civilization will survive. We have removed the major pestilences of town living and we are on the way to remove some of its discomforts, but new problems arise as the old problems are removed and we are hard pressed to keep pace with our self-created troubles. The success of our efforts will be judged on the rate of our progress and by our wisdom in the choice of means of achieving it. Some of this disquiet is evident in medicine to-day; it finds expression in a rising interest in social medicine, and in a demand that the medical profession, by research, teaching, and practice, should play its appointed part as no other profession can. This interest in social medicine is tinged with some misgivings about its objects, and there are fears that if it is pressed upon the student the intellectual discipline of the old clinical training will be replaced by a loose sentimentalism of the new. Prof. John Ryle's description of the meaning and scope of social medicine, printed in our opening pages this week, should do much to remove these doubts. There will be no great dissension from his view that the last generation of medical students have directed too much time to the details of technical diagnosis and specialized treatment; that they had been engaged too much on the study of how men die and too little on the study of how men live. The fault does not lie entirely at the door of the clinical teachers. They may have followed too much the intellectually satisfying pursuits of technical diagnosis, but on the other hand their field of study has been narrowed by unhappy accidents of legislation and administration which have relieved them of those responsibilities which an earlier generation of teachers shouldered. This is one of the reasons for the decline in their interest in many of the common diseases of civilization.

The Royal College of Physicians of London has recently published the interim report of its Committee on Social and Preventive Medicine, and this indicates the lines upon which the teaching of social medicine might be developed.[1] The committee has foreseen the danger that social medicine might become merely another specialism added to the student's curriculum or tacked on to the existing public health course. Its recommendations include practical suggestions for a scheme of training which would help the student throughout his clinical years. The first aim of the training in social medicine would be to indicate to the student the industrial and social factors which contribute to the causation of disease and to train him in the practice of social investigation. The next aim would be to demonstrate the structure and working of the various social organizations provided by local authorities and voluntary agencies. With this knowledge the doctor would be able to make better use of these instruments for the benefit of his patients. But we must expect still greater results. If the medical profession had a deeper interest in the efficiency of the instruments of medical aid it might bring the steady pressure of its opinion to bear on their reform. We are faced by many schemes of social reform. Not a few of these concern the doctor and the agencies he uses. He should be able to assess the efficiency of an institution as readily as he assesses the effects of other forms of treatment.

It will be difficult straightway to set up in all medical schools departments of social medicine, and it is important that this should not be done until suitable heads of departments are available. But this does not mean that nothing should be done. In most medical schools there is at least one teacher with an "interest in humanity" who could arrange and inspire if the responsibility were placed upon him. If he did no more than arrange with his colleagues that time and place should be found for the instruction of students he would have done much. But beyond that there is the practical task of bringing the almoner's department into its proper status, of organizing a student's health service, and of improving the hospital's social machinery. It may appear strange that hospitals should need "humanizing" in some of the ways that are recommended in the report of the Committee of the Royal College of Physicians, but it is no more strange than the final recommendation that the College "should take an active interest in the organization of the teaching of social and preventive medicine," for there was a time when it was expected to advise on all matters concerning the health of people and to suggest means for its improvement. We shall await with interest the fulfilment of the promise that in its next report the Committee on Social and Preventive Medicine will discuss the arrangements of social medicine outside the hospital. Here it will be in touch with problems more difficult than the teaching of students or the arrangement of almoners' departments.

[1] See *British Medical Journal*, Oct. 30, 1943, p. 553.

TREATMENT OF GAS GANGRENE

The concerted study of gas gangrene planned shortly after the war began is now bearing fruit. The Middle East has for long been the only theatre of operations in which any abundance of clinical material was available, and the excellent use made of it is evident from the papers of J. D. MacLennan,[1] whose study is classical in its scale and thoroughness. He was enabled not merely to obtain information about all cases of gas gangrene among the casualties in a whole series of campaigns, but personally to investigate a large proportion of them. Full bacteriological data, such as are only forthcoming when an expert examines the original material, are thus available for correlation with clinical findings. MacLennan's definitions of various types of anaerobic wound infection distinguish several other conditions from true gas gangrene, and among cases of the latter there were enough due to the more uncommon *Clostridia* to define, in some cases for

[1] *Lancet*, 1943, **2**, 63, 94, 123.

the first time, the clinical picture which they produce. Two points which emerge clearly are the graver prognosis in mixed infections, and the invariable fatality of infection by *Cl. histolyticum*. Sulphonamide treatment was disappointing—a fact for which the frequent occurrence of *Cl. oedematiens* in Libya may be partly responsible, since this organism is relatively insusceptible; combined sulphonamide and antitoxin treatment was clearly more effective.

The organization which worked so well in Libya has naturally had no parallel in the more scattered medical services in this country, nor has any considerable number of cases ever been available at one place and time. The best that could be done was to collect information about diagnosed and treated cases after the event, and Army Form I 1241 was issued to the Services and to the E.M.S. for this purpose three years ago. Returns on this form have now been collected and analysed by Miss M. G. Macfarlane, who describes her findings on page 636. Excluding 88 Dunkirk casualties, about most of which the information was inadequate, and 85 North African cases included in MacLennan's series, her material consists of 165 reports from various sources, including casualties in all three Services treated in this country, recent casualties in the B.N.A.F., and civilian air-raid cases. Unfortunately no bacteriological data are included; the nature of each case is defined only in terms of the site of the lesion and the degree of toxaemia judged to exist on clinical grounds. Nor are any conclusions drawn with regard to the value of sulphonamide treatment; almost all patients received it, and presumably an analysis of response in relation to dosage or choice of drug is not thought feasible. Gas gangrene calls for sulphonamide dosage on the highest possible scale, and if material becomes available for judging its effect a comparison between cases so treated and those given the ordinary doses more appropriate to a less acute emergency might well be made. What this analysis does afford is evidence of the value of antitoxin treatment. From this point of view the data are examined in every possible way, and it emerges clearly not only that the general fatality rate is lower in antitoxin-treated cases but that this applies equally to cases also treated by surgical measures, including amputation, and that early administration is more effective. The main lesson to be learned from this series is that a dose of not less than 50,000 units of antitoxin should be given with the least possible delay; a few hours may be vital in a disease of which the progress is so rapid. Amputation was performed in 64 of the 139 cases; this, and an over-all mortality of 41%, make up a somewhat discouraging picture.

The frequency of amputation suggests that there may have been a tendency to report only more severe cases. That those reported represent only a small fraction of those that have occurred is almost certain: no one is going to believe that in the whole period of the air war on Britain the number of civilian casualties suffering from gas gangrene in hospitals under the control of the E.M.S. has been only 38. Perhaps the publication of these findings may lead to more consistent notification and reporting, but it is doubtful whether form-filling research can ever in any way take the place of personally directed investigation. We would nevertheless emphasize, not for the first time in these columns, the obligation which lies on every surgeon to give others the benefit of his experience.

THE UBIQUITOUS THREADWORM

Seven years ago the chief of the Division of Zoology of the National Institute of Health of the U.S. Public Health Service, the late Dr. Maurice C. Hall, began an extensive research into the various problems of the threadworm. Since then 27 articles by various members of the team of workers employed have appeared in different periodicals, and earlier this year Dr. Eloise B. Cram[1] summarized the work done and came to certain conclusions, some of which are of special interest to the general practitioner. First, it is not sufficiently realized how infectious threadworm infestation is. A single worm may turn out an average of 11,000 eggs; this gives some idea of the extent to which an infected person may be a source of reinfection to himself and of infection to others. Moreover, household studies have shown that the eggs are distributed in the dust of the rooms. Positive findings for eggs, at all levels of the walls, amounted to 91.7% of the samples, and it was concluded that about half of the eggs found were viable or had recently been so. Chemical methods of destroying the eggs were unsuccessful, and it is clear that preventive methods alone cannot control threadworm infection. It is also clear from these American studies that familial infection is only too common. If one person in a family is infected, most or all of the children are likely to be infected, and probably also one or both parents. This is true of all classes, and it is clear that treatment of a patient must usually include treatment of most other members of the household. The second big problem concerns diagnosis. Recent studies have shown that nail-biting, thumb-sucking, nose-picking, grating of the teeth, and nocturnal enuresis are no more common in the infected than in the non-infected child. Positive symptoms are restlessness and insomnia, vague gastro-intestinal disturbances, and local irritation. But the clinical picture is blurred, and the fact that out of 4,000 persons examined by the special "N.I.H." swab method 41.5% of whites and 12.9% of negroes were found to be harbouring threadworms shows how pertinacious worms are, since sampling was considered as representing a fair cross-section of the population. The swab method of diagnosis should be more widely used:

> "The swab consists of a glass rod with its rounded tip covered with a 25-mm. square of plain, transparent, unwaterproof cellophane, the rod being inserted in a perforated cork fitted in a small test-tube. The cellophane tip is stroked firmly over the perianal surface. In the laboratory the cellophane is detached from the rod, mounted in water or tenth-normal sodium hydroxide solution, and examined under the microscope for the presence of pinworm eggs."

The best time for taking the swab is immediately after the patient gets up in the morning—before a bath or evacuation of the bowels. The efficacy of treatment has been checked in the American series by requiring 7 consecutive negative daily N.I.H. swabs beginning from the tenth to the forty-second day after the end of treatment. Most popular remedies come badly out of this strict test. The only way to control this widespread infestation at present is to tackle all infected persons in a household with an effective anthelmintic. This must be relatively untoxic, cheap, and easily administered. The most nearly satisfactory drug tested was gentian violet; although treatment with this was described in this country some time ago,

1 *Amer. J. Dis. Child.*, 1943, **66**, 46.

it has apparently not attracted sufficient attention, as judged by inquiries received in the "Any Questions?" section of this *Journal*.

> "The dosage of the drug for adults was two 32-mg. (1/2 gr.) tablets three times a day before meals and for children 10 mg. (1/6 gr.) a day for each year of apparent (not chronological) age, the total daily amount of the drug for children being divided into three doses. The routine of treatment was varied in different series of tests with a view to determining the most suitable regimen. Part of the patients were given the drug for ten consecutive days, and part were treated for eight days, allowed to rest for seven days, and then re-treated for an additional period of eight days. Both enteric-coated and water-soluble-coated tablets were employed."

A fair proportion of patients experienced some degree of gastro-intestinal upset while gentian violet was being used, but such symptoms subsided quickly when the dose was reduced or if the drug was omitted for a day or two. The method should not be used if there is a concomitant infection with roundworms, with moderate to severe cardiac, hepatic, or renal disease, and any disease of the gastro-intestinal tract. The American summary also includes as a contraindication "alcohol in the digestive system."

PENICILLIN IN TUNISIA

The meeting of the Section of Experimental Medicine and Therapeutics of the Royal Society of Medicine on Nov. 9, the proceedings of which are reported elsewhere in this issue, attracted a large attendance. By common consent the film by which Prof. H. W. Florey illustrated his recent experiences in penicillin treatment was accorded the chief welcome among several notable contributions to the study of this subject. He spent the summer months in Tunisia, evolving, with the help of Army surgeons, methods of treating battle wounds to prevent sepsis. The film first depicts the conditions under which wounded have to be nursed, prominent among which are shade temperatures never below 90° F., clouds of dust sweeping over the tents from every passing vehicle, and swarms of flies settling on every exposed wound. The cases treated had been evacuated from Sicily, and treatment was usually begun several days after wounding, when infection was already established. The method adopted for wounds of soft parts, however extensive, was excision of the skin edges and of damaged tissue bordering the wound, and complete suture, leaving in the wound cavity several narrow tubes, secured in stab incisions bordering the wound, through which penicillin solution was injected at intervals subsequently. In a very large proportion of cases primary healing was secured, and some of the wounds were obviously of a nature and extent which must have led to prolonged suppuration and very slow healing by granulation had "orthodox" methods been used. Suture was possible only under considerable tension in some of the cases. Functional results appeared to be excellent, even in cases classified only as "subtotal" union of soft parts. Compound fractures needed more drastic treatment: a penicillin–sulphanilamide powder was introduced into the wound at the C.C.S., and débridement and complete closure at the Base were followed by about 5 days of systemic penicillin treatment, a total of usually 500,000 units being given by 3-hourly intramuscular injections or by intravenous drip. This method of controlling sepsis in an even more difficult type of case appears also to have achieved a remarkable degree of success, and months of invalidity can evidently be avoided by this method. It is now abundantly proved that wherever penicillin can be continuously maintained sepsis due to Gram-positive bacteria cannot exist: repeated infiltration through tubes can secure this condition in wounds of soft parts after closure, but nothing short of systemic treatment will serve the purpose when bone is involved. No one who sees this remarkable testimony to the possibilities of penicillin treatment in dealing with battle wounds will grudge the large share of available supplies which the Army will doubtless receive until the end of the war.

Gas gangrene due to either of the three main toxigenic species of *Clostridia* should be susceptible to penicillin treatment, judging by the *in vitro* susceptibility of these organisms and by the results at least of prophylactic tests in mice. Information about therapeutic effects in gas gangrene has been awaited with interest, and it was somewhat disconcerting that the first clinical evidence on this subject should consist of the 4 cases described by Col. Elliott C. Cutler of the U.S.A.M.C. which developed gas gangrene actually during treatment with penicillin for compound fractures. It would be interesting to know what the infecting organisms were and whether they exhibit corresponding resistance *in vitro* and in the experimental animal. Two of the cases were in members of Flying Fortress crews wounded in action over Germany. The sky seems a strange place to get gas gangrene, and contaminated clothing is presumably the only possible source of the infection. It was said of the German Navy in the last war that before they put to sea every man was ordered to have a hot bath and put on clean underclothes and uniform, in order to avoid sepsis if casualties occurred. Whether such measures are either feasible or worth while for aircrews has no doubt been considered.

MINISTERIAL CHANGES

Of the new Cabinet appointments announced last week two of them are of the greatest interest to the medical profession—that of Mr. H. U. Willink, K.C., as Minister of Health and that of Lord Woolton as Minister of Reconstruction. Lord Woolton has been more than a distributor of the nation's food during wartime. Guided by first-class scientific advice, he has in fact become "Minister of Dietetics," and has done much to instruct the people of this country that the greater part of good health is good food. If he is as successful in his new Ministry in providing "food, houses, and work" for peacetime Britain, then the ground will be clear for Mr. Willink—the new Minister of Health—to reconstruct the health services of England and Wales. Mr. Willink is under 50 and comes to the task with his recent record of successful achievement as Special Commissioner for the London Region. As son-in-law of Dr. H. Morley Fletcher he will have had personal acquaintance with the aspirations of the medical profession. As a former senior Scholar of Trinity, Cambridge, he will, we can be assured, have real understanding of the ideals of medicine as a learned profession, and of the needs and aims of medical education and research, to which the Cambridge departments of physiology and of medicine have made such weighty contributions. He comes into office at a moment when there is a confusion of counsel in the profession at large, and at a moment when medical distrust of the Ministry of Health is widespread. He will find a medical profession intensely suspicious of doctrinaire plans, but anxious for reform, fully aware of present shortcomings, and eager to respond to a broadminded handling of the problems of health and disease that come within the scope of a central government department. The medical profession has listened patiently to Mr. Ernest Brown, and if he has at times caught the ear of the profession he has never quite touched its heart or its mind. Mr. Brown seemed always to be speaking with two voices—the voice of reason on one day and

the voice of the politician on the next. He had a difficult term of office. But he deserves our gratitude for the campaign on diphtheria immunization, for trying to clean up the milk situation, for introducing measures to detect tuberculosis more quickly. Perhaps more than any other man Mr. Brown knows what difficulties lie before his successor—and may Mr. Willink remain in office at least long enough to profit by the mistakes which he, like all Ministers of Health, will probably make.

CONTROL OF DISEASE IN THE TROPICS

The report of the fourteenth meeting of the Ross Institute Industrial Advisory Committee, held in May, gives a very adequate summary of many widespread recent activities in relation to the control of disease in the Tropics. Referring to the work of the Ross Institute, the chairman, Mr. G. H. Masefield, discussed recent successful work in India, Ceylon, and Africa, particularly in the tea and rubber areas in those territories. Sir Malcolm Watson, speaking in more detail of what had been done, paid tribute to Sir Ronald Ross, whose insight had correctly pointed out the way in which malaria could best be combated. Events had shown that what he had said was right in every respect, and had stimulated research in many tropical diseases, such as yellow fever, relapsing fever, and plague, all of which it is now known are conveyed by different insect hosts. The importance of the part played by the London School of Hygiene and Tropical Medicine, in teaching, in conducting laboratory work, and in field researches, was emphasized by Dr. V. B. Wigglesworth, F.R.S. Without a broad scientific foundation applied work soon became sterile and ceased to grow. On the other hand, were it not connected with practical field problems the scientific work of the school would soon become academic. Thus close liaison between the work of the Ross Institute and that of the Entomological Department of the School was most desirable. During the war almost all the workers in the department had been fully occupied with problems of immediate practical importance to the Services. Prof. P. A. Buxton, F.R.S., and Dr. J. R. Busvine had devised new and more effective methods of dealing with the destruction of lice, the carriers of typhus and other diseases—methods which are being extensively employed at the present time in the Middle East. The question of larvicides and the effective blending of waste oils for the destruction of mosquitoes and work on substitutes for Paris green and for pyrethrum, of which there is at present a world shortage, had also been taken up with useful results. Prof. R. T. Leiper, F.R.S., stressed the need for a scientific basis in dealing with the problems of curative and preventive medicine, and referred to the importance of parasitological studies not only in medicine but in agriculture in the maintaining of healthy crops. Col. Mackie, I.M.S., spoke on yellow fever in Africa and the regulations for controlling the spread of this disease. He explained the term "mouse protection test" and its great usefulness by enabling dangerously infected areas to be accurately determined and quarantine regulations made in accordance. He referred to the necessity for controlling mosquitoes, especially a species of *Aëdes* and other mosquitoes known to carry the disease in the vicinity of aerodromes, and for destroying insects in aircraft alighting in endemic areas, now carried out with a recognized insecticide and an efficient spraying apparatus.

Sir Eric Macfadyen said that the Industrial Advisory Committee was the direct link between the Institute and industry in the Tropics, and that the linking up of the London School of Hygiene and Tropical Medicine, with its high repute and its distinguished achievement in scientific research, and the Ross Institute, with its world-wide record of useful service in combating malaria and other tropical diseases, ought surely to be fruitful. The Industrial Advisory Committee was formed in October, 1928, by the late Sir Charles McLeod with the idea of enlisting the help of those largely associated with the control of industry to allow of a quicker appreciation of the possibilities of radical health improvement in the Tropics by the adoption of new ideas in the control of disease.

THE CLINICAL SOCIETY OF LONDON

In his recent presidential address on this subject before the Clinical Section of the Royal Society of Medicine Dr. J. D. Rolleston said that the formation in 1868 of the Clinical Society of London, the parent of the Clinical Section of the R.S.M., was mainly due to Dr. Headlam Greenhow and Dr. (afterwards Sir) John Burdon Sanderson, who were both assistant physicians of the Middlesex Hospital, the latter being subsequently appointed Waynflete Professor of Physiology and later Regius Professor of Medicine at Oxford. According to Dr. Rolleston the most interesting historical event connected with the Clinical Society was the first medical description in this country of *x* rays, which was made before it nearly fifty years ago. Early in 1896 the society invited Prof. Silvanus Thompson to tell its members about the new discovery. A special meeting was held on March 30, 1896, and was attended by nearly 400 members. Subsequently numerous cases illustrating the diagnostic and therapeutic value of *x* rays were reported at the meetings of the Society and recorded in its *Transactions*. A remarkable custom in the practice of the Society was the frequent establishment of special committees to describe various subjects or individual cases. The most important of these committees were those on myxoedema, the periods of incubation and contagiousness of certain infectious diseases, and the antitoxin of diphtheria which had just been introduced into this country. The course of the Society was successful from the first. At the time of its amalgamation with sixteen other societies in 1907 it numbered 572 ordinary members and 17 honorary members. The first meeting was held on Jan. 10, 1868, under the presidency of Sir Thomas Watson, who was regarded at the time as the greatest English physician of the century and author of a textbook on medicine which was without a rival for over 30 years. The subjects and cases discussed covered the whole field of medicine in the widest sense of the word. It was a remarkable fact that the subject of acute infectious diseases received much more attention from the Society than it subsequently did from the Section, as is seen from the fact that during the forty years of the Society's existence its *Transactions* contained 50 records of acute infectious disease, as compared with only 15 in the *Transactions* of the Section between 1907 and 1942.

The President and Council of the Royal Society have awarded the Copley Medal to Sir Joseph Barcroft, F.R.S., for his distinguished work on respiration and the respiratory function of the blood; and the Davy Medal to Prof. I. M. Heilbron, F.R.S., for his many notable contributions to organic chemistry, especially to the chemistry of natural products of physiological importance.

The Canadian Medical Association has decided to hold a regular annual meeting next year in Toronto during the week beginning on May 22.

EMPLOYMENT OF THE TUBERCULOUS IN INDUSTRY IN THE U.S.S.R.

[FROM A SPECIAL CORRESPONDENT]

Recent numbers of the journal *Problemy Tuberkuloza*, Moscow, provide interesting information on Russian experience of collective arrangements for employing the tuberculous, or those in whom the disease is quiescent, in industry.

Provision of modified working conditions in ordinary industry seems to have been sporadic until about 1936-7, when more systematic arrangements were made through instructions from the People's Commissariat for Health of the Central Council of Trades Unions (which is responsible for much of the factory welfare services). N. E. Vredenskaya of the Central Tuberculosis Institute gives a critical survey of such arrangements in 25 large factories (including the now famous Barricades Factory of Stalingrad) with an aggregate population of 250,000 and 1,500 tuberculous employees (1938, No. 6). (Over half of the latter had a positive sputum, a proportion probably higher than in comparable industrial populations in this country, even in wartime.) There was considerable variation in the arrangements from one factory to another, but the following were some of the desirable features: preliminary survey of the tuberculous persons employed and of their working conditions: accurate clinical and social records of those requiring modified work; education of and explanation to the mass of the workers; special factory committees with executive powers, representing the management, the tuberculosis dispensary, medical officers, the shop stewards, and the social insurance fund, to plan and control suitable work arrangements; and close co-operation between tuberculosis dispensary and the administration, health centre, and T.U. organizations of the factory.

The arrangements might provide that the tuberculous person continued in the same occupation, but the pace or strain of the work was reduced—e.g., fewer benches, part-time work, no night work, more frequent rest pauses, special rest rooms, extra food from the canteen, etc.—or the occupation might be altered with or without similar amelioration; in the case of part-time workers, any loss in earnings was made up from the Social Insurance Fund. Stress was laid on keeping the skilled worker in a skilled job and, if possible, in his own industry; indeed, it was laid down that in selecting workers who were to be retained when personnel was reduced preference should be given to the tuberculous. Retraining for new jobs took place sometimes at sanatoria, but generally in a special centre within the factory by instructors provided by the management. Trainees received allowances and, where necessary, were accommodated at "night sanatoria" (well-known Soviet institutions). The author concludes that these enterprises show great promise, but are only in an early stage of development, a number of difficulties remaining to be hammered out.

The "Prophylactic Workshop"

One of the methods most favoured in the Soviet Union whereby tuberculous workers can be employed, and one capable of catering for relatively large numbers, including selected infective cases, is the special shop or section within a large factory. An example, which was started in 1938 in the Hammer and Sickle works in Kharkov, is described in some detail by Y. M. Gaft and A. A. Kalinin of the Ukrainian Institute for Study of Tuberculosis (1940, Nos. 2 and 3). First a survey was made of the clinical state, working and living conditions, productive efficiency and earnings, records of temporary absence from work, etc., of all the known tuberculous persons in the factory. A special committee, composed as already mentioned, then interviewed each individual. The work of about one-third of them required adjustment owing to its unsuitable nature (e.g., hot foundry work), hours, or shifts. Some of these people were transferred to more suitable jobs in other parts of the works, if necessary after training, and individual arrangements were made also for highly specialized workers drawing high wages.

In all, 56 persons were transferred collectively to the "prophylactic workshop," including those with effective A.P., fibro-caseous disease, and other types; nearly half of them had positive sputum. The workshop served as an independent production unit, making locks, spanners, hinges, etc., and the occupations included those of fitter, turner, and so forth. The workers were kept under supervision by the works medical officer in consultation with the local tuberculosis officer. There were no night shifts, and the working day was reduced and rest pauses lengthened as necessary. Extra food was supplied and infective persons ate at a special canteen. In certain cases the worker slept at the night sanatorium; in others a period away at an ordinary sanatorium might be prescribed. Of the 56 cases studied over 2½ years, 13 improved sufficiently to be transferred to normal sections of the works, 24 were still retained in the "prophylactic shop" at the time of reporting, 13 had deteriorated and been invalided, and 6 had left for personal reasons. A considerable number of those who originally had a positive sputum ceased to expectorate bacilli.

The majority of workers in the special shop showed also subjective improvement; production was satisfactory, and some of them even exceeded their quota. There was less temporary absence than before they were transferred to the special shop. The authors conclude that the "prophylactic shop" has a definite place in the management of tuberculosis in industry. With correct choice of cases and with adequate individual medical care the favourable conditions are beneficial to the course of the disease and help to preserve working capacity, though deterioration in unfavourable types cannot be averted.

Special workshops for the tuberculous may also be units independent of existing factories, and P. B. Torkanovsky describes one of these (1940, Nos. 2 and 3) which employed 200 workers making furniture nails, cardboard, and knitted goods. This undertaking was self-supporting, though the author recommends subsidies from the insurance funds for establishments of this kind. In such shops, owing to the wide selection of patients necessary if they are to cater for large numbers, an absence rate of as much as 30% must be expected; the absences are mainly of persons in whom exacerbation has occurred and those passing a period in a sanatorium.

Retraining the Tuberculous

The retraining of tuberculous persons for new industrial occupations is of major importance in schemes of rehabilitation, and, as already mentioned, this has been considerably developed recently at centres within the large factories. In a further paper (1940, No. 10) Vredenskaya gives some of the advantages of this system—namely, affected persons are retained in their own industry, equipment and instructors can be obtained, and it is comparatively easy to place the worker in a job when trained, and to do so in consultation with the tuberculosis officer who has supervised his medical and social requirements during retraining. Workers are also retrained at special workshops connected with tuberculosis dispensaries or with residential sanatoria ("prophylactic work centres"), and this system is described by P. P. Pekar and D. K. Kuryachaya (1940, No. 11) and by Y. E. Berenson (1941, No. 2).

The findings of these authors may be summarized as follows: the aim of retraining should be to maintain if not to increase the earning power of the affected worker; tuberculous persons should be retrained who are engaged in work at high temperatures or in dusty occupations, in work involving heavy physical exertion, work in the food industry or in contact with children, or who are exposed to toxic hazards or to rapidly changing weather conditions; manual occupations suitable for trainees include those of turner, fitter, electrician, knitting and sewing machinist, etc.; persons with an unfavourable prognosis should be excluded from retraining schemes, the most suitable cases being those with satisfactory lung collapse or with limited productive lesions; courses of retraining usually have to last 6, 8, or even 12 months.

The enormous transferences of heavy industry since the war have necessitated many adjustments in the Soviet rehabilitation programmes. To make up for inability to use many residential sanatoria, the number of night sanatoria has been increased, and, to supplement these, there is an extensive network of "day sanatoria," most of which are near large factories and are proving of assistance in the rehabilitation problem. Those employees who are thought by the tuberculosis dispensary to require special care can eat and rest at the sanatorium during

their midday break, while part-time workers can spend their off-time there (*Soviet War News*, 1943, No. 534).

United Nations' Experience

It is interesting to note that rehabilitation schemes for the tuberculous are developing according to different patterns in different countries. In the U.S.A. there is the "Altro" sheltered workshop scheme in New York City. In England interest has centred round the "village settlement" or colony, either for permanent residence, as at Papworth, or for prolonged or semi-permanent settlement, as at Preston Hall. While in the U.S.S.R. there is wide recognition of the value of the village settlement, Soviet authorities appear to be concentrating upon large-scale rehabilitation of the tuberculous in or around the normal sites of industry, mainly by special arrangements within existing factories, though also by separate workshop units. There is no doubt that by these means they hope to provide, within a reasonable time, suitable and safe re-employment for all those needing it, whether they are convalescent and non-infective or chronic, still active (and often infective) cases (i.e., the "good chronics"). In England the war has increased the problem of the tuberculous in industry, for many persons previously idle have re-entered factories and offices and are doing unsuitable full-time work, often subjecting other and young workers to the risks of infection. The war has also increased general interest in the problem and has brought about a realization of public responsibility, as evidenced by the reactions to the recent reports of the Medical Research Council and Tomlinson Committees. The Ministry of Health's new schemes for mass radiography and for financial help will bring the need for systematic tuberculosis rehabilitation schemes to the front. Fortunately, the pooled experience of the United Nations will be available to facilitate a rapid advance in this branch of social medicine.

ASSOCIATION OF PHYSICAL MEDICINE

Nearly twenty years ago, in opening the winter session at the Leeds School of Medicine, Lord Horder (Sir Thomas Horder, as he then was) spoke on physical medicine, and urged the formation of an association to encourage the study of the action of physical agents and their application in the promotion of health. The British Association of Physical Medicine has at long last been formed, with Lord Horder as its first president and Dr. P. Bauwens as its honorary medical secretary.

Inaugural Address

In delivering the inaugural address Lord HORDER said that the birth of the association had come at an appropriate time when the problems of reconditioning and refitting the people of this country, physically, mentally, and spiritually, after their injury in all these aspects by a life-and-death struggle against a sporadic outburst of barbarism had to be faced. There could be no rigid boundaries of physical medicine, but it might be said, on Brig. F. D. Howitt's definition, to have three functions: the achievement and maintenance of physical fitness; diagnosis and treatment, by physical means, of disease and disability of the locomotor system; and the physical selection, training, and reinstatement of personnel in industry and the armed Forces.

"Never was the individual citizen so marked down for hygienic attention as now. Statesmen vie with each other in schemes for improving his physique and giving him an equal mind, so valuable to the State is the contribution which in the last resort he, and he only, can make." One good result was a re-survey of the position from the national point of view, with a clearer vision than before. There was no doubt that in the past we had "let our bodies go, as it were; our civilization had literally gone to our heads, and our heads were not standing it too well either, for there were quite a lot of folk bothered by anxiety, fear, hopelessness, and odd tricks played by their nerves. So let's give the body a chance for a bit, and don't let us think we are wasting time in doing so."

The association's "brief," Lord Horder went on, included control of the whole range of physical measures of diagnosis, prognosis, and treatment which went conveniently by the generic name of physiotherapy. The range was very wide and included some of the most valuable agencies and methods known to medicine. Into this group came skilled manipulation, massage, gymnastics, remedial exercises, balneology, and other forms of hydrotherapy, the application of light, heat, and cold in various ways, other kinds of ray therapy, and electrical methods. In all these matters the association could speak with authority, and if it did not "pull its punches" its influence would be incalculable. He warned against the temptation to play up to the public demand for the machine—the public thought an apparatus could not lie—or to give them the physiotherapist's equivalent of the bedside manner. The consideration of the spas and health resorts of the country also entered into this matter. The position which these had so far taken in physical medicine was unsatisfactory as compared, for example, with the use made of its spas by Soviet Russia. The State must be educated in the value of spa and health resort treatment in the prevention as well as in the cure of disease and in promoting the efficiency of the worker.

In the aetiology and treatment of chronic rheumatic diseases we had gone ahead with treatments in the absence of exact knowledge of causative factors (as also in cancer), or, the causative factors being known, we had lacked specific therapy (as also in tuberculosis). In the case of cancer it was really a form of physical treatment—namely, radium and *x*-ray therapy—which had brought relatively good results, and in tuberculosis also it was a series of physical treatments that had changed for the better the outlook for the chronic case.

Education of Profession and Public

Lord Horder went on to point out that the constitution of the new association stressed the importance of undergraduate and postgraduate training in the principles and practice of physical medicine, and it existed to encourage both of these. It also included a general clause in which it expressed as its aim the protection and furtherance of the interests of physical medicine. "We hold a brief for improving the status of the physical medicine specialist and for securing a diploma in physical medicine. The endowment of one or more universities would help us further towards attaining our aims than anything else that we could do." There remained the education of the community in the value of physical medicine—a big task, but one which must be undertaken. It included close co-operation with the educational authorities, the schools, and industry, keeping always in mind the doctors who advised these bodies and interests. These doctors should be invited to join in such discussions and the subsequent recommendations.

Certain aspects of physical medicine, Lord Horder concluded, had been markedly developed during recent years, as, for instance, radiology, which had staked out its special claim and taken its place within the hierarchy of medicine. This had grown to such dimensions that it could look after itself; but he recalled that he helped to nurse it in its infancy and stood by it in its tender years. The Chartered Society of Massage and Medical Gymnastics had developed into a corps of extremely proficient technicians, and he had for two periods occupied its presidential chair. It had also been his privilege to lead a group of colleagues in the formation of the Empire Rheumatism Council, a body which had produced a scheme for national action in the endeavour to solve the problem created by the series of crippling diseases due to rheumatism, and he was now chairman of the joint committee recently set up between that Council and the British Orthopaedic Association. Not all the causes of physical medicine which he had championed had been won. Now the British Association of Physical Medicine had been formed, and although he was president for its first year "the future of this association lies with you, and not with me, but I have faith that you will make that future a good success."

V. J. Birnberg and A. E. Hansen (*J. Pediat.*, 1942, **21**, 774), under the name of thrombophlebitis migrans, describe a rare clinical syndrome characterized by repeated venous thromboses occurring intermittently or concurrently, chiefly in the superficial veins in various parts of the body. Their case, which occurred in a boy aged 14, was the first recorded in a child. Heparinization failed to prevent further venous thromboses, and necropsy showed that death was due to mesenteric thromboses. Bacteriological examination gave no clue as to causation, but the presence of eosinophil inflammation and swelling of the intima of an involved vein suggested an allergic phenomenon.

Reports of Societies

DISCUSSION ON PENICILLIN

One of the largest meetings ever held at the Royal Society of Medicine took place on Nov. 9 for a discussion on "Penicillin" in the Section of Experimental Medicine and Therapeutics (the new name of the Section of Therapeutics and Pharmacology). The Barnes Hall was crowded out, and many stood during the whole three hours of the proceedings. Dr. R. D. LAWRENCE presided.

Early Experiments

Prof. A. FLEMING said that "penicillin" was the name he gave originally to an antibacterial substance produced from a mould. Mycologists knew many varieties of the fungus *Penicillium*, but only one of these, apparently, resulted in the substance known as penicillin. All the substance which had so far been made in this country derived from that early culture. He cultivated it in fluid medium, and found that the fluid under the mould had an antiseptic property which acted powerfully on certain micro-organisms, such as the haemolytic streptococcus and the gonococcus. He then tested it on leucocytes, because the antiseptics he had previously tested had a far greater lethal action on leucocytes than on bacteria; but that was not the case with penicillin. Nevertheless, the crude penicillin which he obtained in those early experiments was not very strong, early attempts at concentration were not successful, and, although it remained in the laboratory for certain purposes, its therapeutic use fell into abeyance until revived by the work of Florey and his associates at Oxford.

A warning was necessary that penicillin treatment should not be applied in infections by micro-organisms which were not sensitive to the drug; it was not a cure-all. Further, it was desirable to make tests of the bacteriostatic power of the blood to determine how much of the drug remained. It might be that good therapeutic results were obtainable with penicillin even when such a small dose was injected that by present methods no bacteriostatic power could be detected in the serum. Perhaps its most important use was locally in more or less minor infections, and not in the dramatic cases where patients were occasionally snatched back from death. The action of penicillin was bacteriostatic rather than bactericidal. With penicillin, as with the sulphonamides, the destruction of the organisms had to be largely by the tissue cells or blood cells, and therefore it followed that the best results would be obtained in patients who had the highest degree of immunity. Although in most cases brilliantly successful results were obtainable by penicillin alone, there were cases where immunological methods would help, just as with the sulphonamides. He added that as soon as the chemists discovered what the subtance was and could make it, no doubt they would experiment with the molecules and produce a series of new preparations, some of them perhaps far stronger and with a wider application than the original penicillin.

Characteristics of Penicillin

Prof. H. W. FLOREY (Oxford) said that any credit for the Oxford work attached to the whole of a group of workers there, who, incidentally, were under no delusions concerning the discovery, and realized that a series of lucky accidents had led to the present position, although there had at the same time been a good deal of hard work. Pure penicillin would inhibit sensitive organisms in dilutions of 1:50,000,000 to 1:100,000,000, and morphological effects on the streptococcus were to be seen even to dilutions of 1:250,000,000. The sensitive bacteria included *Str. pyogenes, Staph. aureus, Str. pneumoniae, Str. viridans, B. anthracis*, and several others. Among those which did not give good therapeutic results was the bacillus of tuberculosis.

Chemical properties affecting clinical application were the stability of the salt between *p*H 5 and 7, its destruction by boiling, by oxidizing agents such as hydrogen peroxide, by the enzymes produced by some bacteria, and by heavy metal ions such as copper and lead. There must be neither acids nor alkalis in any vessel in which penicillin was handled. These facts explained why the substance was so difficult to make. Its biological properties included lack of toxicity for mice and other animals. Leucocytes and tissue cultures were unaffected by solutions many times stronger than were required for bacteriostasis. It was little influenced by the number of bacteria present. It was not inhibited by pus, a matter which was of cardinal importance in explaining why results were obtained with it in purulent infections, nor was it inhibited by tissue autolysates or by blood or serum. It was excreted in urine (rapidly), in bile, and in saliva, but not in tears or in pancreatic juice. It did not penetrate to the cerebrospinal fluid. Absorption was rapid from muscle and subcutaneous tissue and from the small intestine. It could not be given by the stomach because most stomachs contained acid, nor by the rectum on account of bacteria.

Methods of Administration

It was clear from animal experiments, Prof. Florey continued, that it would have to be given by certain indicated routes. It could be given continuously intravenously or intermittently intravenously, and the dosage on which they had worked was 15,000 units every three or four hours. Penicillin was one of the few drugs—indeed, he did not know of any other—with which it was not necessary to worry about excess. With the sulphonamides one had constantly to consider whether one was getting to the toxic level, but with penicillin an overdose offered no terrors, and as time went on and more and more penicillin became available, if the chemists rose to the occasion, they would have to beware of trying to work on minimums, because they were bound to give not enough at some time or other. Inadequate dosage was a real danger. Another factor to be remembered was the possibility of having an inactivated penicillin as the result of the presence of a strain of organisms which, though belonging to the sensitive species, was in fact an insensitive strain. One worker had said that about 4% of staphylococci encountered were penicillin-resistant. In local administration there must be adequate access to all infected parts, and this depended upon surgical technique, which was the main problem in the use of penicillin at the present time. Sustained application must be made, for there was fairly rapid absorption. What looked like a great excess of penicillin would quickly diffuse into the infected tissues.

Penicillin in the Treatment of War Casualties

Prof. Florey went on to say that he recently had the opportunity of going to North Africa and using penicillin in co-operation with ten surgeons in that theatre of war. What they tried to do was to sew up infected wounds and also fractures, giving penicillin to prevent sepsis. He showed a film taken in North Africa and the Middle East and illustrating the treatment of war wounds by this method. Out of 171 cases so treated, complete union was obtained in 104, subtotal union in 60, and failure in 7. The film showed the operation, from the first cleaning of the limb with soap and water, the trimming of the skin edges and muscle, the insertion of tubes, and the closing of the wound, to the instillation of the penicillin, which in a number of the cases was repeated twice daily for five days. The stitches were removed after ten days, and in many of the cases, as illustrated on the film, the patient showed excellent recovery with a good usable limb about 24 days after treatment, or 28 days after the infliction of the wound. In some cases penicillin was used with sulphanilamide powder and the mixture blown on to the wound. Stress was laid on the necessity for an efficient blower to secure good distribution of the powder with the minimum of wastage. In the case of one dirty wound treatment was by insufflation of powder for four days. In another the patient was given 500,000 units of sodium penicillin parenterally. In the case of a septic stump a similar dosage was given over five days. In certain cases the penicillin and sulphanilamide mixture was inserted locally at the casualty clearing station, and afterwards at the base hospital 500,000 units of penicillin parenterally were given.

The PRESIDENT at this point asked for a definition of the unit of penicillin. Prof. Florey replied that the unit was a purely arbitrary amount of material which had been chosen in the very early days for experimental purposes.

Vehicles for Penicillin Administration

Flight Lieut. D. C. BODENHAM (R.A.F.) described some experiences at an R.A.F. hospital in the treatment of localized streptococcal and staphylococcal infections by direct applications of penicillin. He said that certain conditions responded extremely well to very small doses; other conditions responded poorly by the methods at present available for local treatment. As for the preparations of penicillin which could be used for these different types of wounds, the calcium salt supplied to him had varied in potency from 6.8 to 163 units per milligramme, and the daily application of only 4 units per sq. cm. of granulating surface could be effective. Some method of diluting penicillin became necessary, and three methods had been adopted. The first was a simple solution of penicillin dissolved in water, and for practical purposes the strength had varied from 100 to 500 units per c.cm. Then the need arose for a powder which could be applied with an insufflator to the wound. A neutral diluent was wanted, and the choice was made of sulphanilamide prepared in powdered form. The preparation consisted of mixing with the sulphanilamide a 5% light magnesium oxide. This could be autoclaved at 5 lb. pressure for 15 minutes. When cooled it was shaken with penicillin powder to give a final strength of the penicillin and sulphanilamide mixture of 1,000 units per gramme. Another preparation was ointment which could be applied to the granulating surface. For this purpose lanette wax 33%, vaseline 33%, and water to 100% were taken. This could be autoclaved at 10 lb. pressure for 20 minutes. When it was cooled the penicillin solution, prepared beforehand in the strength of 500 units per c.cm., was mixed with it, and the emulsion state was retained. One important point about this emulsion was that it was an oil-in-water emulsion in continuous phase. The consistency of it could be altered by simply adding more and more water. It was easily mixed with penicillin, it would adhere to a wet surface, and could be easily removed with water alone. The strength which had been used for most of the infected surfaces had been 100 units per gramme. For success in all these conditions the penicillin must gain access to every part of the wound all the time. That might be beyond the scope of the technique in some cases, but unless it could be achieved success was not likely.

Types of Wound Suitable for Treatment

Flight Lieut. Bodenham, continuing, said that in treating a large number of cases it became obvious that if the greatest good was to be obtained some chart should be prepared from which the salient observations could be made and rapidly recorded. It was necessary to know what was the type of wound, its cause, and what time had elapsed since it was inflicted. The cases which Prof. Florey had illustrated had been fairly recent ones; many of his own series came late, after other methods had first been tried. The earlier these cases were treated the less penicillin was needed and the better the result. It was necessary also to know the nature of any previous treatment, the type of organism, and the type of surface discharge.

In surface wounds such as burns the treatment used had been the application of 100 units of penicillin cream per gramme every 24 or 48 hours. The response had been good, negative swabs being obtained after four or five days. This was the most successful of the groups. In so-called "gutter" wounds penicillin cream had been applied to the amount of 100 to 200 units per gramme. In severe infection penicillin powder applications might be made every 24 hours. A wound measuring 10 in. by 2 in. and 1½ in. deep required 7,000 units per day. Powder could be applied to the wound and solution to the pockets, but the latter were a difficult problem. In sinuses the treatment was to give penicillin solution through a catheter passed to the limit of the track, the solution being 250 units per c.cm. The injection should be sufficient to fill the track every four hours. Quite obviously in these more complicated wounds penicillin alone could not be expected to heal them when other factors, such as fibrotic cavity walls, were playing a part. The treatment of cavities turned largely on whether they were dependent or inverted, as the former would hold fluid. Penicillin solution was given through a catheter, 100 to 250 units per c.cm., and 10% of the volume of the capacity of the cavity should be given every four hours. The bacteriological response was good; the clinical result depended upon various other factors and was sometimes disappointing. The most difficult problem was the complicated cavity occurring in infections of joints, multilocular empyemata, and the like. Here the response to local treatment, even in large doses, was poor. Two cases of acute arthritis of the knee (staphylococcal) had 10,000 units per day for 15 days, but the result was poor. Complicated cases could not be expected to respond to penicillin alone, and surgery must be used to convert such cases to one of the simpler types in which penicillin was effective.

American Army Experience

Col. ELLIOTT C. CUTLER (U.S.A.M.C.) described four cases of severe fracture—in three of them of the femur and in the other of the tibia and fibula—which had received an instillation of 10,000 to 20,000 units of penicillin in solution when treatment was started. But in spite of continuous intramuscular applications of penicillin the presence of gas-forming organisms was detected in the wound after three or four days, and in all these cases the limb had to be amputated. Large amounts of penicillin were again applied intramuscularly—in one case 20,000 units every three hours until the patient received 1,000,000 units—and in all cases the condition after amputation was satisfactory and the patients had remained well.

In reply to a question as to whether the penicillin had any effect at all upon the gas gangrene, Col. Cutler said that they all felt that it had played a major part in survival. His own opinion was that anti-gas-gangrene serum was not very efficacious.

Major J. N. ROBINSON (U.S.A.M.C.) described an experience in treating sulphanilamide-resistant gonorrhoea with penicillin. The series of cases numbered 95, and in nearly all of them the penicillin was given intramuscularly to a total of 100,000 units. Of these cases 93 were cured at the end of one course of treatment, another was cured after a second course, and the last one did not respond to two courses and was considered a failure. Treatment was also tried in three cases of gonorrhoeal arthritis, one of which was successful after 200,000 units of penicillin had been given intramuscularly—15,000 units every three hours—but the other cases, which received only 100,000 units, were not cured. There were no toxic manifestations. The first 30 cases had been followed up and showed no evidence of recurrence or urethral discharge.

Further Clinical Trials

Mr. R. VAUGHAN HUDSON (Middlesex Hospital Penicillin Research Committee) described an investigation on 33 cases chosen because they were penicillin-sensitive as compared with an equal number chosen chiefly because they were insensitive. One method of treatment did not necessarily avail in all the stages of infection. It was in the case of the open wound that the issue was so complicated by the depth of tissue involved and the alteration of blood supply due to trauma. They had learned that a wound might be sterilized but would not heal if the blood supply or local metabolism was insufficient, and, alternatively, in the face of a good blood supply and lowering of the bacterial count, a wound would heal in spite of the fact that it was not completely sterile. As soon as infection was controlled, structure being adapted to function, early movement would improve the blood supply and hasten repair. Penicillin broke the link between the mobilized tissue and the dead tissue, so that by the systemic route with quite a short term of dosage the slough would separate, and proteolytic action of the contents of the tissue fluid would fragment it and enable it to be easily removed. The dosage for this purpose was somewhere between 100,000 and 300,000 units by the systemic route administered every three hours.

Prof. R. V. CHRISTIE (Hill End Hospital) said that during the past six months 117 cases had been treated in his department with penicillin, 104 by local and 13 by systemic administration. In a group of 34 patients with infection of bone, 14 were cured after penicillin administration. The administration was in some cases combined with surgical treatment, but whenever such treatment was performed it was shown that the identical operation was unsuccessful without penicillin. Of the remaining patients 13 were improved and 7 unaffected. In only three of these cases had the duration of infection been less than

one month. The presence of a sequestrum was not in itself a contraindication to penicillin therapy, but the results were not so good as in cases without sequestra. In the group of infections of the soft tissues 44 cases were treated, 23 being cured and 10 improved. Those having a duration of less than one month obviously responded better than those of longer duration. He also mentioned the use of penicillin in certain skin conditions. Excellent results had been obtained in some cases of impetigo.

Lieut.-Col. J. S. JEFFREY said that in the surgical treatment of these wounds penicillin very quickly dealt with the Gram-positive pyogenic organisms, but they were still left with the Gram-negative, which resulted in Gram-negative pus in considerable amounts. When the wounds were sutured up closely this might collect in the dead spaces and cause trouble; therefore where there was danger of a dead space it was thought better to leave the centre of the wound open. He also mentioned rather disappointing results from giving penicillin alone in cases of gas gangrene. In gas gangrene the necrotic tissue was no longer getting an adequate blood supply, and therefore the penicillin was no longer being carried to that part. Nevertheless, there was absorption from that necrotic part, and therefore anti-gas-gangrene serum should be given.

Mrs. FLOREY gave an account of some work in which penicillin had been used in generalized infections, chronic sinuses, abscesses, arthritis, skin infections, infections of the eyes and lips, empyemata, acute mastitis, and acute infections of the hands—a miscellaneous collection of separate clinical entities. From the biological point of view they had been chiefly staphylococcal infections. Out of rather over 300 cases 250 had shown complete recovery, 41 had improved, and in 14 no change had been registered. She showed some photographs illustrating the restoration of function in hands following treatment of the infection by penicillin. There were rapid relief of pain and disappearance of swelling, but the restoration of function was the most striking of the differences. The cases included palmar sepsis and tendon-sheath infections which had been successfully treated.

The report of the 1942–3 session of the Royal Academy of Medicine in Ireland states that the attendance at sectional meetings was well maintained, and the Council notes with pleasure the increased interest shown by Fellows in the Section of State Medicine. Dr. T. Percy C. Kirkpatrick, who signs the report, includes memorial tributes to two Honorary Fellows of the Academy—Howard Atwood Kelly, professor of obstetrics and gynaecology at Johns Hopkins, and George Washington Crile, professor of surgery at Cleveland; also to three ordinary Fellows, Dr. William Boxwell, Dr. J. C. Mant Martin, and Sir William Ireland de Courcy Wheeler. A year ago the Council of the Academy, at the request of the Sections of Medicine and of Surgery, appointed a committee to consider the outbreak of anterior poliomyelitis which had lately been reported in various parts of the country. The committee, under the chairmanship of Dr. C. J. McSweeney, found that 364 cases of the disease, or 12 per 100,000 of the population, had been recorded. The mortality varied from 41% in County Clare to 28.8% in Cork Street Fever Hospital, Dublin. The report put forward valuable recommendations for dealing with future outbreaks of poliomyelitis, and urged that the Department of Local Government and Public Health should organize, among its chief medical officers, a body prepared to deal at once with the disease should it again appear in epidemic form.

The annual general meeting of the Association of Industrial Medical Officers was held at the London School of Hygiene and Tropical Medicine on Oct. 16. The chair was occupied by the retiring chairman, Dr. M. W. Goldblatt, who reviewed the work of the association during the past two years, and spoke of the part that he hoped industrial medicine would play in the future reorganized medical services. In proposing Dr. J. C. Bridge, C.B.E., as the next chairman of the association, Dr. A. J. Amor spoke of the honoured place which Dr. Bridge occupied in the world of industrial medicine. Dr. Bridge was elected with acclamation. Dr. W. Blood was re-elected as hon. secretary and Dr. S. A. Underwood as hon. treasurer. At the afternoon session Dr. M. W. Goldblatt read a paper on "The Investigation of Toxic Hazards," and discussion followed.

At the annual general meeting of the Association of Anaesthetists of Great Britain and Ireland held on Oct. 28 the following officers were elected for the ensuing year: President, Brigadier Ashley Daly, R.A.M.C.; Vice-President: Dr. C. Langton Hewer; Hon. Treasurer: Dr. Z. Mennell; Hon. Secretary: Dr. A. D. Marston.

Correspondence

Some Therapeutic Fallacies

SIR,—I was much interested in the article on some therapeutic fallacies (Nov. 6, p. 572), and I hasten to respond with my own views as a general practitioner.

Regarding the question of essential hypertension, I entirely disagree that the patient should not be told; otherwise, by making too light of the matter, the seriousness of the condition will not be fully appreciated. It certainly is not necessary to over-estimate the danger of the condition or to alarm the patient unduly. If one just states that the blood pressure is on the high side, and the patient should take things quietly and attend a doctor, say, once a month, then much will have been achieved. It must be remembered that Drs. Linnell and Thomson regard such patients from a consultant's point of view, but it is the general practitioner who is called suddenly late one day, when such a patient develops a stroke while engaged at some laborious task during his work, or, as has been my experience, on the golf course. In so far as treatment is concerned, I quite agree that there is no specific therapy, but diet in the obese will contribute much to the patient's well-being. Again, repeated blood-letting at frequent intervals will often relieve unpleasant symptoms.

I endorse the remarks on arteriosclerosis and angina pectoris, and also on the use of digitalis. This drug is probably more frequently abused than even the sulphonamides. I consider digitalis a dangerous drug in inexperienced hands, and the sooner the newly qualified practitioner learns to appreciate its use the better. I should imagine the amount of digitalis wasted in this country must be appalling. In those cases which Drs. Linnell and Thomson mention as benefiting from digitalis therapy its use is invaluable.

Anaemia is a condition which requires the utmost consideration. Why prescribe iron *ad lib.* to a patient who is regarded as being anaemic on no grounds other than an examination of the conjunctivae? But how many general practitioners are as fortunate as we in Kingston in having good laboratory facilities easily and cheaply available? It is safer to give iron to the non-anaemic patient than to withhold it from those who need such treatment. This raises the fundamental need for co-operation between the laboratory, indeed all ancillary diagnostic services, and the general practitioner. The foregoing remarks apply in great measure to the use of the sulphonamide group of drugs. Until the general practitioner is able to determine the cause of infection scientifically the abuse of the sulphonamides will continue.

I am disappointed at the remarks made on the use of expectorant mixtures. Do Drs. Linnell and Thomson seriously believe that I can satisfy my chronic bronchitics by telling them to hang over the edge of the bed and cough? In bronchiectasis this treatment may seem reasonable, but not every patient seen by the general practitioner develops bronchiectasis. I have found the average patient with chronic bronchitis as a rule obtains much relief and comfort from simple alkaline expectorants. So far as their use in lobar pneumonia is concerned, when there is associated bronchitis their value has been well proved.

I am in whole-hearted agreement on the subject of constipation. Much harm has been caused by the highly exaggerated advertisements tending to make one feel "bowel-conscious." The treatment of constipation begins with the mother, who can do much by withholding purgatives and training her children into regular habits. A good mixed diet with plenty of fluid and regular exercise are all that are needed for the normal person. It should, however, always be remembered that constipation is often the first symptom of serious disease, and a complete investigation should always be undertaken.

In conclusion, may I express my appreciation to Drs. Linnell and Thomson for their very interesting observations.—I am, etc.,

Kingston-on-Thames. M. H. FRIDJOHN.

SIR,—A more depressing exposition of the doctrine of therapeutic nihilism can scarcely have been written than the contribution under the above heading in the *Journal* of Nov. 6; and yet, with the experience of years, one has to admit that much of it is true. Such being the case it is clear that medical textbooks need revision in great part, and equally manifest that teachers of medicine should not exceed the age of about 30, for only thus can it be ensured that the stream of medical instruction will remain pure and undefiled by the babbling inaccuracies of dotards.

While they become almost lyrical about the "beautifully balanced rhythmic movements" and so on of the intestinal canal, the writers, in their suggested treatment of constipation, are all in favour of the *vis a tergo* rather than the *vis a fronte*. But what, after all, can be more unnatural, more unphysiological, and, in most cases, more unnecessary than an enema? One of my teachers used to say, with an air of considerable disdain for the constipated, "All you want is a little marmalade for breakfast." Shades of colocynth, jalap, and gamboge! Just a little marmalade for some of our "chronics"!

The fact of the matter is that there is more egregious nonsense written and talked about constipation than about anything else, and usually by doctors. When someone discovers all that there is to know about Auerbach's plexus then the hidden mystery of constipation may be revealed. As yet constipation is merely the happy hunting-ground for lectures by the dogmatic and the cranky inside the profession and by manufacturing chemists outside. Sophistication, however, in medicinal treatment is not exclusively the property of people of the calibre of the writers, and a sound critical attitude towards remedies and their effects is not unknown among practitioners.—I am, etc.,

Hove. G. L. DAVIES.

Vitamin B Deficiency

SIR,—I was very interested in the article on vitamin B and psychological disorders (Oct. 23, p. 503). For a long time I have found vitamin B particularly useful in psychological states, but my experience, in contradistinction to that of your observers, has been more of its use in psychotic states associated with defective nutrition and absorption, and also in alcoholic patients. Your contributors stress that a certain amount of psychological disturbance, perhaps principally psychoneurotic, is attributable to deficiencies in the amount of vitamin B in wartime diet, and that this, combined with the stresses and strains of these times, precipitates symptoms. I feel that this may well be so, and the authors make a strong case, but in addition I would suggest that there is a by no means inconsiderable number of patients who, where no deficiency in vitamin B is present, seem nevertheless to require amounts of this vitamin considerably in excess of the normal. My own feeling is that there is a definite relationship between the central nervous system's requirements in vitamin B and the amount of intellectual work, whether or no this latter be accompanied by stress, accomplished by the individual.

We should not forget that some of the toughest stocks in Europe—say, our own Highlanders and Norwegian fishermen—live habitually on a diet in which the content of vitamins B and C is very low. It can be argued that these people as a whole show no very marked signs of vitamin deficiency. They are, however, living natural lives, whereas in our grossly urbanized communities a large number of the population are in what one might call occupations requiring mentation as much as manual work. As these accessory factors are necessary for the oxygenization of carbohydrate for the nutrition of the central nervous system it does not seem too far fetched to postulate that, apart from any question of stress or strain, the brain in more constant use requires more vitamin B than that of those engaged in more natural occupations.—I am, etc.,

Bath. A. GUIRDHAM.

Retention of Urine and Pyelitis in Girls

SIR,—I hope you will kindly allow me space to air these comments on a detail affecting the health of young children in schools.

Recently I have had a girl of 7 under my care. She was acutely febrile, running a temperature of 104.5° for the first two days, and complained of abdominal pain and headache. The condition proved to be an acute pyelitis, and under treatment with sulphanilamide and a citrate mixture subsided in a week. A chat with her parents elicited a fact which gave me a clue to a possible cause for the condition. The child herself, an only child, was exceptionally well cared for, and the home spotlessly clean and tidy. I was informed that the little girl had come home from school on a number of occasions with wet underclothes. It was stated with conviction that the schoolmistress was in the habit of refusing permission to children to leave the classroom to perform natural excretions. This child had either been frequently refused, or, being nervous, was afraid to ask permission to leave the classroom.

Now, although I am aware that pyelitis is not uncommon in young female children, it struck me that here was at least one reason why this is so. One can readily imagine the train of events following a series of enforced retentions of urine in a full bladder. Slight infection is caused by the first few efforts at retention; further infection is facilitated by the wearing of a wet and soiled undergarment; and later attempts at retention of the contents of a full and infected bladder easily lead to infection of the renal pelvis.

Conversation with other parents of young children (I have two of my own) leads me to believe that this repressive attitude is fairly common among schoolmistresses having charge of youngsters. In my view this habit is both unfeeling and dangerous to health. It may be argued that children are expected to relieve themselves conveniently at playtime. But young mites can easily forget, or may not feel the urge at the exact time. They are then afraid, if the teacher has been known to be severe on the matter, to mention their desires, and attempt an uncomfortable and possibly dangerous retention. It should, in my view, be the proper part of a teacher to invite children to run out and empty the bladder or bowel if they feel the need, or if they have missed doing so at playtime or other recess. If school authorities have not issued any instructions to teachers on this matter, it should be time that they did wherever young children of tender ages (say, up to 9 or 10 years) are concerned.—I am, etc.,

Birmingham. C. C. GRAYSON.

Septic Hands and Fingers

SIR,—Your recent correspondents on the maltreatment of septic fingers appear to agree on one point only—they all blame the poor general practitioner for their bad results.

A small proportion of septic fingers starting as deep-seated infections—either subperiosteal (blood-borne) or deep pulpar (implanted or blood-borne)—will cause local damage and destruction of tissue with ultimate slough separation in spite of early and expert surgery.

The warning of the misuse of hot fomentations is justified. Stress should be laid on the damaging effect of using oiled silk (now supplanted by oiled paper in the *N.W.F.*). This is probably more responsible than any other factor in the production of the horrible soggy lifeless skin so often seen. Unfortunately home-nursing books and lecturers still appear to advocate its use.—I am, etc.,

London, S.W.16. HARRIS AVERY.

Financial Allowances in Tuberculosis

SIR,—The recently introduced Government scheme of monetary allowances for tuberculous subjects has, not unnaturally, attracted widespread interest, not only in medical but also in lay circles. The recent correspondence in the *Times*, initiated by a tuberculous patient, raises points of significance and interest to readers of both lay and medical press, concerning, as it does, all occupied with the control of tuberculosis.

Three of the prerequisites for the control of tuberculosis are: (1) early diagnosis, vastly stimulated by the recently introduced mass radiography service; (2) early treatment, which involves convincing the patient, frequently the bread-winner, of the absolute necessity for accepting prolonged treatment in a sanatorium with the minimum delay; (3) prevention of the spread of infection to family contacts. Hitherto the overriding social and economic problems confronting the patient have militated, not unreasonably, against his accepting medical advice. Those of us closely connected with chest clinics and sanatoria,

and faced with this constantly recurring dilemma of the patient, can fully appreciate the human problems and hardships involved.

The Government scheme of financial allowances seemed to indicate the fulfilment of long-cherished hopes and a great advance in the direction of alleviating such problems, but those of us who attended the recent conference of the National Association for the Prevention of Tuberculosis heard with mixed feelings the Minister of Health expounding the scheme, and many criticisms from authoritative sources were raised regarding (1) the inadequacy of the allowances, and (2) the discrimination between the early and the chronic, the pulmonary and non-pulmonary case. The purpose of the scheme is to enable men and women to undergo treatment without financial hardship to themselves or their dependants, but previously many progressive authorities, with one of which I am intimately connected in a consulting capacity, have, through public assistance and social welfare departments, made allowances not infrequently higher than the present Government ones. In addition, personal contact between tuberculosis workers and the local departments has made possible special treatment for certain individual cases of hardship. The distinction between the two categories of patients leads to the chronic—who is not necessarily incurable, even though his cure may not be sufficiently complete to enable him to return to whole-time war industry—falling into a state of despondency with a personal grudge against his tuberculosis physician and against social workers. Such an attitude, engendered perhaps by a misunderstanding of the scope of the Government scheme, renders co-operation yet more difficult, and brings to naught suggested plans of vocational guidance and rehabilitation, designed to make even the partial invalid a useful citizen.

It is therefore to be hoped that the widespread and genuine apprehension felt will be allayed by a complete review by the Minister of Health of the scale of allowances for tuberculous patients, and that these allowances will be extended not only to a wider group of sufferers from this disease but also, may one venture to hope, where similar circumstances apply to other forms of chronic invalidism, such as, for example, rheumatic, cardiac, and other pulmonary diseases. The financial burden of any such scheme will be considerably reduced, taken as a long-term policy, if the actual allowances which enable the patient, freed from economic and therefore mental anxiety, to undergo adequate treatment in a proper spirit of co-operation are followed by schemes of industrial training and subsequently protected or full employment.—I am, etc.,

London, W.1. PHILIP ELLMAN.

Institutional Provision for Mental Defectives

SIR,—I was interested in Dr. M. Greaves's letter (Oct. 30, p. 559). The position in Halifax is that we have a fairly long list of mental defective cases awaiting institutional accommodation. The general national position appears to be that there are about 17,000 imbecile and idiot children and 84,000 adult defectives in need of institutional care. The total incidence of mental deficiency is at least 320,000. It is clear that the number of defectives is so great that for many years to come it will be impossible to provide an adequate amount of institutional accommodation. I hope mental deficiency will be labelled as a "priority" on the post-war planning and reconstruction blue-prints. Although the prevention and control of the disease will never make a good political vote-catching device the matter is one of extreme social importance.—I am, etc.,

Halifax. G. C. F. ROE, Medical Officer of Health.

Infectious Mononucleosis

SIR,—Halcrow, Owen, and Rodger's excellent article on the subject (Oct. 9, p. 443), which will certainly widen our views on the frequency and epidemiology of the disease, draws attention to the difficulties in differential diagnosis. It may, indeed, be impossible in the early stages to differentiate the condition from German measles, especially if blood counts are done before the typical mononucleosis has developed.

In a woman aged 36 who fell ill with high temperature and developed enlargement of the lymph glands in the posterior triangle of the neck, the total white cells were 6,800 and the differential count showed no eosinophils, 60% polymorphs with marked shift to the left (21 stab forms out of 60), 31% lymphocytes, some of them atypical, and 9% monocytes; 3% Türk cells were also found. Pyrexia, swelling of lymph glands, and blood picture were very suggestive of rubella. However, the rash which I predicted did not appear and pyrexia continued. The differential count a week after onset had changed to 26% polymorphs (5% stab forms) and 74% mononuclear cells, many of which were atypical and contained nucleoli. This clinched the diagnosis of infectious mononucleosis, which was then proved by a positive Paul-Bunnell test.

Similar findings have not been infrequent. To complicate matters, H. J. Templeton and R. T. Sutherland (*J. Amer. med. Ass.*, 1939, **113,** 1215), who observed skin eruptions in 17 out of 91 cases, have stated that in 12 of the 17 cases the rash was indistinguishable from German measles.

In the case mentioned a trial was made with sulphathiazole, which produced immediate fall of temperature and rapid improvement of clinical symptoms. This is in contrast to the experiences of Halcrow, Owen, and Rodger, who used sulphapyridine, but Hoffman, Lees, and Comros (*Amer. J. med. Sci.*, 1942, **203,** 731) recorded prompt improvement in all treated patients after sulphathiazole, while their previous experiences with sulphanilamide were disappointing.—I am, etc.,

London, W.1. H. UCKO.

Sulphonamides in Otitis Media

SIR,—I think a warning should be given as to the use of sulphanilamide and its relatives in acute otitis media. I use it freely myself and have seen no ill effect in these cases, but if the membrane is bulging when I see the patient I have invariably performed a myringotomy before starting treatment.

I have, however, been sent on account of deafness a number of patients, mostly children, who, having had pain in the ear for two or three days, have been put on treatment and who have never discharged. When I have seen them some four weeks later the membrane has been bright but adherent in whole or part and the child very deaf. Even in older children, who would permit catheterization of the Eustachian tube, I have usually been unable to improve the hearing. I believe that these cases are those in which an effusion has occurred and has dried up without perforation of the membrane on administration of sulphanilamide. I believe that they can be avoided if the sulphonamide is not administered to a child with a bulging drum without a myringotomy being performed at the same time. The disaster does not seem to occur in cases seen extremely early when the membrane is only flushed and not bulging, nor in cases in which a discharge has already begun when the sulphonamide is administered.—I am, etc.,

Northampton. E. BROUGHTON BARNES.

Precision Cephalometry and Pelvimetry

SIR,—Dr. Millington (Oct. 16, p. 495) points out that with a lateral tube-shift a knowledge of the tube-film distance is unnecessary. A useful table of correction factors for each millimetre of the shadow-shift from, say, 10 to 30 mm. with a 3-in. tube-shift may be quickly compiled, the formula being $\frac{T}{T+S}$ (T being the tube-shift and S the resulting shadow-shift), and this greatly curtails the calculations. Such a large error as half an inch in the tube-shift results in an error in the calculated result of about one-tenth of an inch, not a very large discrepancy with such a mistake, and proving the accuracy of the method if the distances be carefuly adhered to.

However, if all calculations are to be avoided and the work greatly shortened, the use of a chart (as described in the *British Journal of Radiology*, April, 1942) is required. In this case a knowledge of the height of the diameter above the film is necessary, and for this the tube-film distance must be known and must be constant, a convenient distance being 30 in., which is, moreover, the optimum distance for the Potter-Bucky diaphragm. Also, for the antero-posterior diameters—i.e., the conjugate and pubo-sacral—in the lateral film, where

there is no tube-shift, a knowledge of the distance is imperative, and the height of the diameters above the film has to be measured. This can be accurately determined by a measurement of the over-all width of the great trochanters with a calliper, the patient being then turned on to her side into such a position that the measurement of the cleft of the buttocks to the table is equal to half the width of the great trochanters, which with the addition of the distance of the table top from the film gives the height of the diameters above the latter. This method also ensures the superposition of the great trochanters and brings the diameters truly parallel to the film.

A point which does not seem to be generally appreciated is that, provided the diameter to be measured is parallel to the film, the position of the tube in its horizontal plane is unimportant. It may be moved to any position in the same plane and suitably tilted so as to project the diameter on to the film, and the measurement of the projection will remain unaltered the ratio of the tube-diameter distance to the diameter-film distance remaining constant, and the correction factor therefore constant. This requires to be stated, as a recent paper on this subject said that if the tube be centred over the conjugate diameter and the same correction factor be applied to the more distant pubo-sacral diameter, a false computation of the latter will be obtained. Ocular proof that this is not the case may be readily furnished by taking two films of a penny placed at a height of 5 or 6 in. on a cardboard box parallel to the film, one with the tube centred directly over the coin and the other with the tube at a considerable distance, say 12 in., in the same horizontal plane and suitably tilted, when the projection of the image of the coin in the two films will be found to be identical in all respects with no distortion.

The only measurement for which accurate centring of the tube is necessary is for the oblique diameters which are at an inclination with the film, when the tube must be accurately centred in the midline over a point midway between the plane of the anterior-superior spines of the ilia and the symphysis pubis. The calculation here is considerably more complicated, and perhaps of less importance except in special cases (*vide* the paper already cited).

The most valuable measurement is the determination of the inlet and outlet in square measure (square centimetres), which may be said generally to determine the advisability, or the reverse, of Caesarean section. The measurement of the foetal head presents more difficulty as it is seldom that the occipito-frontal or suboccipito-bregmatic or the biparietal diameters are in a plane parallel to that of the film. However, this measurement is of less importance. Gross abnormalities—as hydrocephalus—are immediately apparent; otherwise the variations are not very great, and the head is a malleable object able to adapt itself by moulding within fairly wide limits to the shape and size of the rigid pelvis.

It is to be hoped that the discussion has shown that *x*-ray pelvimetry has a very real value in obstetrics—a matter upon which doubt has recently been cast in some quarters.—I am, etc.,

Newport. W. H. HASTINGS.

Epidemiology of Weil's Disease

SIR,—The article of Capt. S. Varadi (Jan. 30, p. 126) and the letter of Dr. K. Blum (Feb. 20, p. 231) on Weil's disease prompt me to draw attention to some recently emphasized knowledge concerning the epidemiology of leptospirosis, and to suggest that this knowledge might be useful when attempting to trace the source of infection in certain cases of Weil's disease.

At least two types of pathogenic leptospirae (*L. pomona* and *L. mitis*) are known to be endemic in pigs and cattle in the coastal district of South Queensland,[1] and all of our cases have had contact with one or other of these animals. In 1939–40 a serious outbreak of classic Weil's disease, with several fatalities, occurred in Western Samoa, a mandated territory of the Dominion of New Zealand. Investigations performed in Brisbane showed that the disease was heavily endemic in Samoan pigs.[2] Many of these patients were probably infected after contact with pigs. No work has yet been done to ascertain whether *L. icterohaemorrhagiae* exists in Australian pigs, but in view of the fairly high incidence of leptospirosis in imported rats (especially *Rattus norvegicus*) in Brisbane,[3] it is possible that the disease may be present in piggeries situated near urban areas.

These facts may not be well known to the profession in Britain. I feel, however, that they are of sufficient interest and importance to justify intrusion on your space in time of war, for it may well be that farm animals in Britain also can act as carriers of the disease.—I am, etc.,

Brisbane. D. W. JOHNSON.

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2 Annual Report on the Health and Medical Services of the State of Queensland for the year 1940.
3 Johnson, D. W., Brown, H. E., and Derrick, E. H. (1937). *Med. J. Austral.*, **1**, 811.

Disappearance of Breast Cancer with Stilboestrol

SIR,—The following report of the disappearance of primary and secondary breast cancer with stilboestrol seems worthy of note.

A married woman aged 62 was seen by me in January of this year with a hard lump in the left breast adherent to the skin and clinically a typical case of scirrhous carcinoma. She also complained of a lump in the left axilla which she had noticed for four months. She looked pale and had lost 3 st. in weight. I sent her to see our consulting surgeon, Mr. E. K. Martin, at the Wembley Hospital, who confirmed the diagnosis and advised operation. Her weight then was 7 st. 4 lb.; haemoglobin 76%; *x*-ray examination of chest showed fibrosis only; the liver was palpable.

She was operated upon by Mr. Martin on Feb. 1, a left radical mastectomy, but removal of growth in the axilla was incomplete owing to attachment to the brachial plexus. The breast and axillary tumour were sent to the Bland Sutton Institute of Middlesex Hospital for examination. The pathological report was: "Carcinoma of breast; growth is a spheroidal-celled carcinoma; there is one large deposit of similar growth in the axilla." She was in hospital for five weeks and her convalescence was slow. It was intended to send her elsewhere for deep *x*-ray therapy, but her condition gradually worsened and she was never fit for it.

On July 22 she was again seen by Mr. Martin, who reported extensive recurrence on skin, scapular region, and posterior triangle. It was decided to administer stilboestrol. Her weight then was 6 st. 9 lb.

Her health gradually improved, the tumours slowly disappeared I was so gratified with the result that on Oct. 21 I sent her to see Mr. Martin again, who confirmed there was nothing to be seen or felt in the posterior triangle, skin, or scapular region. She has gained 16 lb. in weight; haemoglobin 95%. She now looks well and does her own housework. It appears to be a cure. The dose of stilboestrol has been quite small, 0.5 mg. daily for three periods of twenty-four days. She has also had iron by the mouth. The acid serum phosphatase has not been estimated but it is intended to do this.

I am grateful to Mr. E. K. Martin for his permission to publish these notes and also to the Bland Sutton Institute for doing the pathological work.

—I am, etc.,

Wembley. R. TUDOR EDWARDS.

Treatment of Lupus Vulgaris

SIR,—The recent completion of five years' work by the three Finsen-Lomholt lamps installed by Glasgow Corporation at Baird Street Hospital, Glasgow, gives us an opportunity to review our experience of these lamps.

In that period 103 lupus patients have had treatment, the number under treatment in any particular year varying from 75 to 86. Twenty-two patients are quite free from lupus nodules at present and are probably healed. Forty-eight patients are regarded as having markedly improved, and of these about half are nearly healed, there being only odd nodules present in their scars. Twenty-two have improved to a less degree. Ten patients have had insufficient treatment to enable an estimate of the result to be made. One has died from a complicating epithelioma. In all 21,608 hours of treatment have been given, and the number of individual attendances has been 12,588.

The clinic is in operation on two days a week from 9 a.m. to 5 p.m. and on three days a week from 9 a.m. till 8 p.m. Every endeavour is made to arrange suitable times of treatment for workers, and a large proportion of our patients are in employment. One nurse is in charge of three lamps. Servicing is carried out by the corporation electricity depart-

ment. About 15% of our patients come from surrounding local authorities.

We are particularly interested in Dr. Arthur Burrows's letter (Oct. 2, p. 432), in which he implies that 20 minutes is commonly an average exposure time for one treatment. Our experience has been that nothing less than one hour is satisfactory.

As regards plastic surgery, we are endeavouring to make use of the facilities in the emergency hospitals of the Department of Health for Scotland. We are in very close co-operation with the local radium institute for treatment of patients in whom malignancy supervenes. We have tried as much as possible to reserve this method of treatment for face cases, because of the soft pliable nature of the scar which is left —a great advantage as compared with former methods of treatment.—We are, etc.,

Glasgow. S. I. A. LAIDLAW.
A. MACLEAN.

Regional Anaesthesia

SIR,—I have just read the annotation on regional anaesthesia (June 5, p. 700), and hope to be allowed to submit this criticism.

1. Is it correct to say that "one may assume that unconsciousness during surgical operations would have been welcomed for its own sake"? One finds rather that very often the oblivion of general anaesthesia is feared as much as, or more than, the operation itself.

2. ". . . Those whose hands cannot be gentle and whose tongues must wag while they work should be discouraged from surgery under regional anaesthesia." Surely such exponents of what should be an art should be discouraged from its practice altogether. General anaesthesia can be no excuse for clumsiness. And if tongues must wag—as they must when the surgeon is teaching—cotton-wool in the patient's ears solves that difficulty.

3. There is no question of "forcing an unwilling patient to remain awake." Premedication, which plays so great a part in local anaesthesia yet earns no mention in the annotation, prevents psychological disturbance of the patient.

4. Should the patient choose his anaesthetic? Does one ask him if he prefers ether to chloroform? Where regional anaesthesia has proved its safety and efficacy—as in brachial and caudal blocks, intercostal block, infiltration block for herniotomy, dorsal nerve block for circumcision—he will nearly always accept the anaesthetist's advice if the question is raised at all.

5. Though the "constant search for a local anaesthetic drug which, while giving effective anaesthesia, is relatively non-toxic" still goes on and will go on, procaine, which holds the field to-day, is far from unsatisfactory or dangerous. It may, indeed, never be superseded, but regional anaesthesia will continue to progress, with British anaesthetists, one hopes, leading the way.

6. With this final quotation one must be in full agreement: ". . . It will be to the ultimate benefit of everyone that its study is being taken up by anaesthetists rather than as a minor side-line by surgeons." The anaesthetist must master it and its combinations with general anaesthesia. The surgeon must not displace him, but must be able to give his undivided attention to the operation, while his indispensable ally watches the interests of the patient.—I am, etc.,

Cairo. M. ARNOLD,
Capt., S.A.M.C.

Statistics of Neurotic States

SIR,—Having had some part in encouraging Dr. Collier to proceed with the labour for his article (Oct. 9, p. 461), may I be permitted a few comments on Dr. Turner's letter (Oct. 30, p. 556)?

Dr. Collier's basic facts—his assessments of the patients—clearly require testing by another study on similar lines, which, it is to be hoped, may be forthcoming. I am sure that Dr. Collier hoped both for this and for criticism and discussion of his findings and interpretations, but I saw nothing in his article to warrant Dr. Turner's final sentence. There is certainly nothing worse than "figures without facts," but he presented all the necessary figures to enable the reader to draw his own conclusions, and the field is still open for the facts to be tested. He gave a clear exposition of the dimensions of his population at risk and of the method of selection of his sample; were this not so rare in medical literature Dr. Turner might perhaps have been more able both "to understand and to check" his findings.

It is unfortunate that Dr. Collier did not mention why some of the 2,000 cases selected did not appear in his analysis as "cases of ordinary sickness"; but a reasonable inference from Table I is that he saw some of the 2,000 for other reasons. Surely Dr. Collier's data could not be expected to produce evidence on the duration of psychiatric treatment required for his cases? But the number of cases occurring in one year which might need such treatment is still of interest.

His essential findings were, surely, that in one year among those with unduly prolonged disablement there were 280 cases with, in his opinion, manifest nervous or psychiatric disorder, and that this represented a minimum incidence of 3.8 per 1,000 in the basic population at risk. It would be unfortunate if these major findings were blurred by admittedly valid criticism of some of his minor deductions when the primary figures were fully and clearly presented.—I am, etc.,

Mill Hill, N.W.7. RUSSELL FRASER.

SIR,—I regret that my anxiety to compress my paper (Oct. 9, p. 461) and thus to save space caused me to omit to state that some of the 2,000 cases were rejected either because the records were not sufficient to warrant inclusion or because they were seen for reasons not directly connected with "sickness." Most insurance societies have some "special rules," the interpretation of which raises issues that are not strictly medical. I rejected them because I felt that their inclusion would obscure the results. I was trying to study "unduly prolonged sickness." I feel sure that the figures in the tables can be relied on as being generally accurate.

I do not consider that my study "proves" anything whatever. More similar studies would be needed before "conclusions" would be justified. I hope my study showed what kind of information on a matter of great importance might be derived from similar sources. Any general practitioner or any officer in charge of large bodies of sick persons could carry out a similar inquiry. I hope to be able to present a further study in a few years' time if there still seems a useful purpose to be served by carrying it out.—I am, etc.,

Worcester. HOWARD E. COLLIER.

Mosquitoes in Static Water Tanks

SIR,—This correspondence (Oct. 2, 23, 30) has largely become a discussion about the practical value of larvivorous fish. In Persia all house compounds, even the smallest, and all gardens have "static" tanks, so that, even on the high and very dry plateau, there is plenty of malaria, most of it "man-made." In the grounds of the British Legation at Teheran (extensive and many tanks) we proved that goldfish devoured the larvae, and thereafter we were not troubled except by occasional immigrants. We also provided fish for the summer Legation and the Persian village hard by. They bred fast and their colour made untrained inspection easy. Theoretically their universal use would stamp out malaria in a large city like Teheran. Whether *Carassius auratus* would appreciate the conditions in some of our static tanks is another matter. However, a very experienced observer, your correspondent J. F. Marshall of the Bureau of Mosquito Control, assures us that here it is largely a question of "non-biters" and that oil and larvicides are to be had. Authorities can therefore prepare and act promptly if necessary. Owners of garden tanks would do well, however, to keep goldfish in them. Or does war with Japan mean yet another "world shortage"?—I am, etc.,

Droitwich. A. R. NELIGAN.

"Descriptive" Medicine in the Lay Press

SIR,—Cannot something be done to prevent the publication in the Press of ill-judged and lurid details of medical therapeutics? Under the guise of helpfulness certain papers present the general public with details of modern medical methods and discoveries. Actually they are merely making "copy" in a quite unjustified journalistic manner for their own ends. In fact they are being "sensational."

In a Sunday paper recently there appeared a description of electrical shock therapy with such sentences as, "A drastic treatment of electric shocks," "A tremendous drama,"

"The result is frightening to watch. The patient loses consciousness and jerks into convulsions like a man in an epileptic fit," and "These dramatic fits." While the purpose of this article was to show that melancholia with suicidal tendencies can now be cured, the effect will be quite the opposite.

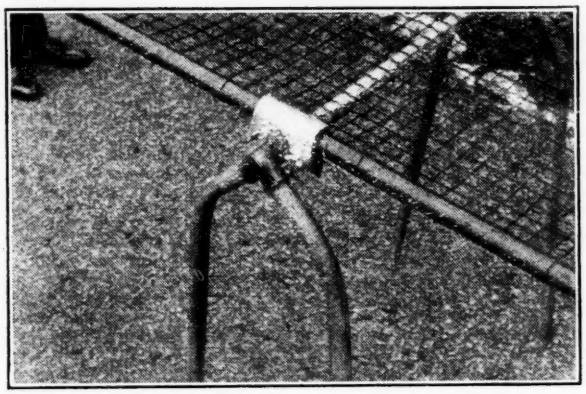
Those of us who use this method know only too well that patients are extremely interested in what happens to them during this treatment, and that they are frequently worried lest they should say or do something which will make them appear ridiculous. Other depressives before undertaking treatment inquire anxiously what will happen during the treatments. Well, they now have their answer; it will be increasingly difficult to reassure them or their friends, and very probably many sufferers will now prefer to continue their misery rather than suffer "five or six of these dramatic fits," especially if they have seen a genuine epileptic fit!

Psychiatrists and psychiatric social workers are doing everything to encourage the timid and frightened psychoneurotic and psychotic patients to seek early treatment. This sort of irresponsible journalism is not likely to make their job any easier. It is to be hoped that in future the medical profession will be given some sort of say in matters of health publicity. Perhaps a "medical corporation" will be permitted to exercise some form of censorship in these purely medical matters.—I am, etc.,

Ryhope, Sunderland. T. MARTIN CUTHBERT.

Fixing Stretcher for Artificial Respiration

SIR,—In the recent correspondence regarding the "Eve" method of artificial respiration suggestions have been asked for a suitable and quick method of fixing the stretcher on a bar. The accompanying photograph shows a one-piece metal



"hood" which can be positioned quickly, and is prevented from sliding by two bolts with butterfly nuts. The clamp was made by Mr. W. Wardrop of this post.—I am, etc.,

J. ALLAN WHITE,
M.O., Ardrossan-Saltcoats First-aid Post.

The Human Side of Medicine

SIR,—Without in any way questioning Dr. Stark Murray's sincerity (Nov. 6, p. 591), one must wonder how he conceivably arrives at the belief that "the change over from an individualistic system of medicine to a comprehensive national service will give us the opportunity to humanize completely the relationship between patient and doctor. . . ." One indeed questions what humane treatment means to Dr. Murray. Others beside myself no doubt saw State medicine in action in Socialist Vienna—magnificent hospitals magnificently equipped, where the patient was just "Case No. 793," and often treated in a way that would never (up to now) be tolerated anywhere in this country. This was not because the doctors and surgeons of that famous medical centre (in pre-Nazi days) were any less humane than their counterparts in London, but because the relationship between patient and doctor had been brought down to the level of that between the taxpayer and the income-tax inspector—not a person but a thing, not a personality but a body. Does Dr. Murray seriously consider that his relationship to an individual in his "official capacity" is ever more human than to that individual as an individual?—I am, etc.,

London, W.1 ALAN MABERLY.

Obituary

W. BURTON WOOD, M.D., F.R.C.P.

Dr. Wilfrid Burton Wood died on Nov. 2 at Shalford, near Braintree, aged 59. He was the son of a Manchester merchant who had long family associations with that city. Dr. Burton Wood went to the Leys School and later to Jesus College, Cambridge, and to St. Bartholomew's Hospital. He served in the Middle East during the last war, and on returning to England in 1921 started his public health career in the Tilbury Dock area as tuberculosis officer. He very quickly revealed his interest in all manifestations and aspects of tuberculosis, and never spared himself in doing the very best for every patient. The part-time medical officer of health retiring, he was asked to take over the duties of M.O.H., and thus filled one of those pioneer combined medical officer posts which have been carefully fostered in the County of Essex and since adopted throughout the country. He spent most of his spare time at week-ends and holidays in doing voluntary work at the London Chest Hospital, and on taking his M.R.C.P. he was put on the honorary staff of that hospital.

With the wide and valuable experience he had obtained he took up private practice as a consultant physician in London in 1926. He was appointed senior clinical tuberculosis officer to the County Council of Essex. He was particularly interested in the Essex County Council Hospital at Black Notley, where he attended regularly for the treatment of women and children suffering or suspected to be suffering from pulmonary tuberculosis. Later he was to carry out the same work at both the Harold Court Sanatorium and the Essex County Council Hospital, Broomfield Court. Special consultative clinics for Essex tuberculosis officers were conducted by him at the Essex County Council Hospital, Black Notley, and also the London Chest Hospital. He had the knack of attracting to himself disciples who enjoyed nothing better than one of his clinical demonstrations where cases were seen and discussed on the most equal terms.

In 1940 Dr. Burton Wood was elected F.R.C.P. His many writings on the varied aspects of chest diseases, particularly in children and adolescents, and his profound knowledge of radiographic pictures of the lungs, often provoked valuable discussion. He has undoubtedly been the spearhead of the antituberculosis campaign in Essex during the last twenty years, and his passing will leave a gap extremely difficult to fill. His command of the English language was extraordinary; he had the gift of expressing his thoughts in a telling and interesting, and often humorous, manner. As a lecturer he was outstanding, and in every utterance revealed the extent of his reading and studies. He was never afraid to express his opinions, usually in a forthright manner and always to the benefit of those with whom he came in contact. He was a most delightful colleague.

W. A. B.

F. J. POYNTON, M.D., F.R.C.P.

H. L. T. writes: The death of Frederick John Poynton could have caused no surprise to those who had seen him recently. Poynton was a character and sometimes appeared almost wishful to be an oddity. He was a countryman, and deliberately retained a countryman's characteristics with a certain scorn of personal appearance.

Short and stocky in build, he was enormously strong. He held the curious record of captaining a first-class county cricket eleven after attaining to the sober dignity of a Fellow of the College of Physicians. His outstanding cricketing feat was achieved in two hours at Hove when he and Sammy Woods scored 305 runs at top speed for Somerset against Sussex, and he loved to recall the episode. In his cricketing days he was always known as Joseph, and in the pavilion at Lords during big matches he would be affectionately greeted by many old friends. He played hockey for Middlesex and had some skill at real tennis. He had a fine tenor voice and sang for many years in the choir of St. James's Church.

Unfortunately he allowed his professional life to be clouded by what he considered to be the unsympathetic attitude of the profession towards his researches on rheumatic fever, though his resentment never extended to individuals. When speaking in public and at medical meetings he seemed to delight in supporting some illogical standpoint, and while he amused his audience he was not taken very seriously. But when he dealt with a sick child he had a knack of talking spontaneously as if they were equals, and every child felt at ease with him.

He was a delightful personal friend and a great companion on a holiday. He enjoyed every moment, even when missing a critical

short putt and backing his car by mistake on to an outraged goat, which instantly attacked him. Life was not too kind to him and some blows left their mark, but to the end he retained his power of boyish enjoyment, his sincerity and his honesty and his love of children.

Medical Notes in Parliament

"Pay-as-you-earn"

In the House of Commons on Nov. 2 Sir JOHN ANDERSON stated that since the question of "pay-as-you-earn" income tax was debated he had given very careful consideration to the possibility of extending the scheme to the whole range of Schedule E incomes. He had found, not unexpectedly, that a fresh problem emerged and gained importance as they mounted the income scale. That fresh problem arose from the possibility of an adjustment between profits, which were assessed under Schedule D, and income assessed under Schedule E. Such adjustment would be quite lawful in a variety of cases and, if no special safeguard were applied, might result in the loss of considerable revenue. He was advised that the only fully effective safeguard would be to levy a supplementary assessment on any increase of remuneration in respect of the current financial year. He gave an assurance that either in the next Finance Bill or in a special Finance Bill he would include a provision extending "pay-as-you-earn" to the whole range of Schedule E taxpayers, with the appropriate safeguards, which the House could debate. If the House passed the next Finance Bill including these provisions it would make no difference to the date on which the benefit of "pay-as-you-earn" was given to the taxpayers not included in the present Wage-earners Income-tax Bill, because it could be arranged that the charges in the cases (of over £600 a year) not now covered should take effect from the same date—the beginning of the next income-tax year.

Food and Health in India

The food situation in India was debated by the House of Commons on Nov. 4. Mr. AMERY said pressure of population against the means of subsistence was India's gravest problem. Improved health conditions had contributed to it. In the last 12 years the population of India had grown by 60,000,000. Every month over 300,000 additional mouths had to be fed in British India alone. The impact of war had jeopardized the precariously balanced structure, and a year ago widespread, possibly universal, famine had threatened India. That menace was brought within narrow limits. This year Bengal had been affected by local calamities and an all-over shortage. In the last three months every effort had been made to get food through to Bengal. The Bengal Government had taken steps to move all destitutes from Calcutta to relief camps where they could be fed and medically reconditioned. Field ambulances, clearing stations, and medical staffs were being made available for the establishment of a large number of small hospitals. We had released from this country 500 tons of dried milk and South Africa had offered a quantity of milk products.

Sir JOHN ANDERSON reported that the main paddy (rice) harvest in Bengal this winter promised to be very good. If it proved so, they should be near the end of their troubles. At the end of the year the British Government would review the situation again.

Mr. COATES said 1,000 people were dying weekly of starvation in Calcutta and 50,000 in the country districts.

Hospital Domestic Staff: Conditions of Service

In a statement to the House of Commons on Nov. 4 Mr. ERNEST BEVIN said that he had considered the proper organization and supply of domestic staff in wartime to institutions caring for the sick. He found that there was a lack of any recognized rates of pay, etc., and without these effective action on a large scale was extremely difficult. He therefore appointed at the end of July a committee, under the chairmanship of Sir Hector Hetherington, to advise on the rates of pay and other conditions of employment. The report of the committee had been received, and he proposed to accept its recommendations. Where certain conditions were fulfilled he would deal with recruitment to this work in exactly the same way as to any other form of national service, whether in industry or the Services, according to the priority allotted to it and including the use, as necessary, of powers under Defence Regulations. He was appointing a small standing committee to advise on any further steps which should be taken on such matters as training, welfare, etc. He was also concerned with the problem of the private household suffering undue hardship owing to sickness, childbirth, or other emergency. Plans for dealing with such cases were under consideration.

Our Parliamentary correspondent adds that the rates and conditions proposed in the Hetherington report will not be compulsorily imposed on all hospitals and kindred institutions, but domestic staff will only be directed by the Ministry of Labour to hospitals and other institutions which comply with the Hetherington report. Existing agreements made with trade unions in respect of domestic staff will be accepted as substitutes for the Hetherington scale. The Ministry aims at ensuring that hospital staff meals are as good as factory canteen meals, and will hold the governors of hospitals responsible for ensuring this. Mr. Bevin is willing to develop training in cooking for women entering the domestic service of hospitals. The decisions which he announced on Nov. 4 will apply to private nursing homes and private mental hospitals.

Deaths from "Tonsillitis."—Mr. ERNEST BROWN stated on Oct. 14 that tonsillitis was not separately identified in the International List of Causes of Death adopted as the basis of classification in this country, but deaths therefrom were included and constituted the major portion of those under the heads "Septic Sore Throat" or "Other Diseases of the Pharynx and Tonsils" in respect of which specific mention of tonsils or tonsillectomy was made in the death certificate. The numbers of such deaths registered in England and Wales in the four years 1939 to 1942 were 512, 478, 386, and 404 respectively. The information was not available for years before 1939.

A Pensions Grievance.—Mr. QUINTIN HOGG on Oct. 21 raised the case of the widow of Mr. William Bremner Highet, a surgeon employed at the Wingfield Hospital, Oxford. Mr. ARTHUR HENDERSON, in reply, said Mr. Highet was an orthopaedic surgeon of great ability who volunteered for service in a special appointment in South Africa at the request of the War Office. That appointment carried with it the rank of major. Mr. Highet was commissioned with the rank of lieutenant. The Secretary of the Central Medical War Committee then informed the War Office that Prof. Seddon, under whom Mr. Highet worked, considered Highet should be given full specialist status with the rank of major. A reply was made on behalf of the D.G.A.M.S. saying that Mr. Highet on assuming his oversea appointment would be raised to full specialist status. This would carry the rank of major. Mr. Highet died as the result of enemy action at sea. Under the Pensions Warrant the award was dependent on the paid rank held at the time of the casualty, and at the time of his death Mr. Highet was being paid as a lieutenant. Mr. Henderson said the War Office was here bound by the provisions of the Pay Warrant. In accordance with the regulations which operated to-day, the pension must be assessed on the pay for the rank he held at the time of his death; but in view of the strong representations made in the House Mr. Henderson promised to convey to Sir James Grigg the feeling of the House that this case should be given special consideration.

Surgical Care of British Prisoners in Germany.—Mr. SORENSEN, on Nov. 2, asked the Secretary of State for War the number of prisoners of war recently returned from Germany who received surgical attention in Germany as the result of wounds received during the war; how many were fitted with artificial limbs by the German authorities; and whether he had received a report respecting the general surgical and medical treatment that our soldiers received. Sir JAMES GRIGG said that detailed information was not yet available but was being collected. Very few of these men were fitted with artificial limbs by the German authorities. Most of them had reasonably effective appliances improvised in camp workshops. In general there were few complaints from the prisoners about medical treatment, much of which was, however, carried out by British medical personnel.

Diphtheria in Immunized and Unimmunized.—Mr. ERNEST BROWN has stated that returns from local authorities in England and Wales for periods between Jan. 1, 1940, and June 30, 1943, showed that among approximately 107,000 children who were notified during those periods as suffering from diphtheria approximately 9,500 in the aggregate had completed the course of immunization. The returns for the year 1942 showed that among approximately 1,530 children known by local authorities to have died from diphtheria in that period 41 had completed the course of immunization. The corresponding provisional figures for the first six months of 1943 were 600 and 21.

Antifreeze for Doctors.—The Regional Transport Commissioners have been asked to consider favourably applications for antifreeze made by doctors, nurses, and other persons engaged on work essential to the war effort, provided that the nature of the work is such that they cannot reasonably be expected to adopt alternative measures against frost—for example, draining their radiators.

Fluorescent Lighting for Daylight.—It is the policy of the Ministry of Works to provide fluorescent lighting in rooms from which daylight is excluded and where important war work is carried on. The Ministry is not aware of any grounds for suggesting that the light is deleterious to the human eye, provided precautions are taken to prevent flicker.

Notes in Brief

Mr. BROWN announced on Nov. 4 that an offer he recently made on behalf of the Government to present to the Soviet Government two of the mass radiography units now being manufactured in this country had been accepted. They would be sent to Russia almost immediately. One was to go to Stalingrad and the other to Leningrad.

No. 43

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Oct. 30.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1943 (a)	(b)	(c)	(d)	(e)	1942 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	26	3	21	1	—	57	3	17	3	1
Deaths		—	—				—	3		
Diphtheria	702	39	166	101	33	898	35	273	101	22
Deaths	21	1	5	3	—	14	1	—	2	—
Dysentery	248	54	66	2	—	290	12	52	—	—
Deaths				—	—			—	—	—
Encephalitis lethargica, acute	—	—	—	—	—	3	—	6	—	—
Deaths		—					—			
Erysipelas			67	6	4			47	4	4
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				59					42	
Deaths	55	4	17	12	5	47	5	12	29	2
Measles	585	49	74	27	2	6,812	288	292	24	16
Deaths	2	1	—	—	—	4	—	2	—	—
Ophthalmia neonatorum	75	6	19	—	—	83	3	34	3	—
Deaths										
Paratyphoid fever	5	—	2	—		7	—	2	—	
Deaths	—	—	—		—	—	—	—		—
Pneumonia, influenzal*	576	53	21	1	10	582	43	2	1	2
Deaths (from influenza)	25	4	14	3	2	11	1	2	2	—
Pneumonia, primary			258	21				156	16	
Deaths		24		9	10		—		10	7
Polio-encephalitis, acute	1	—				4	—			
Deaths		—					—			
Poliomyelitis, acute	13	1	2	3	1	27	1	1	17	—
Deaths		—					—	—		
Puerperal fever		4	18		—		1	16	2	2
Deaths		—					1			
Puerperal pyrexia†	196	11	14	1	5	145	4	13	1	2
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	3,623	276	412	50	109	2,583	129	433	61	56
Deaths	1	1	—	—	—	1	1	1	—	—
Smallpox	—	—	—		—	—	—	—		—
Deaths				—	—				—	—
Typhoid fever	7	—	3	6	—	12	—	2	5	1
Deaths	2	—	—	1	—	—	—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	3	—
Deaths				—	—				—	—
Whooping-cough	1,693	105	205	12	16	1,015	81	38	25	3
Deaths	3	2	5	2	—	8	1	—	1	—
Deaths (0–1 year)	304	32	68	43	15	306	45	64	47	12
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	4,287	678	596	197	126	3,834	584	517	182	111
Annual death rate (per 1,000 persons living)			13·4	13·0	‡			11·6	12·2	‡
Live births	5,822	704	879	336	259	5,497	648	770	363	265
Annual rate per 1,000 persons living			17·9	22·1	‡			15·9	24·2	‡
Stillbirths	208	20	41			227	25	32		
Rate per 1,000 total births (including stillborn)			45					40		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes puerperal fever for England and Wales and Eire.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

EPIDEMIOLOGICAL NOTES

Discussion of Table

In *England and Wales* notifications of scarlet fever rose by 306, those of whooping-cough by 234, and of measles by 39; the incidence of diphtheria fell by 23, and of cerebrospinal fever by 20 cases.

The increases in scarlet fever and whooping-cough were due mainly to the experience of the North. In whooping-cough the largest rises were in Lancashire by 62 and in Yorks West Riding by 31. The biggest increase in scarlet fever was in Yorks West Riding (50 cases more), London and the south-western counties reporting a decline. The higher incidence of measles, on the other hand, was due to a rise of 65 in the south-east. In the north there was a tendency for a decline, the biggest drop being in Lancashire (46 cases fewer). The 26 notifications of cerebrospinal fever constituted the lowest total recorded in any week since the rise following the outbreak of war.

Dysentery was as prevalent as ever, only one case fewer than in the preceding week being reported. There were two relatively large outbreaks during the week—in Dorsetshire (Sherborne U.D. 35), and in Bedfordshire (Biggleswade R.D. 29). The other large centres of infection were in London 54, Lancashire 22, Middlesex 15, Surrey 15, Northumberland 13.

In *Scotland* notifications of diphtheria were down by 67, and scarlet fever by 33, while the incidence of acute primary pneumonia was up by 63 cases, of whooping-cough by 51, of measles by 27, and of dysentery by 21. The increase in the cases of dysentery was due to an outbreak in Edinburgh, where notifications rose from 5 to 29. The western area was responsible for the drop in scarlet fever and for the increase in measles. The rise in pneumonia and the fall in diphtheria were fairly general throughout the country. The chief alteration in local trends of whooping-cough was an increase in Glasgow from 85 to 115.

In *Eire* the chief feature of the returns was a fall in diphtheria from 187 to 101.

The Week Ending November 6

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 3,374, whooping-cough 1,755, diphtheria 770, measles 553, acute pneumonia 676, cerebrospinal fever 44, dysentery 146, paratyphoid 4, typhoid 4.

The Health of the Nation

The nation's health at the beginning of the fifth war winter was reviewed by Sir Wilson Jameson, Chief Medical Officer of the Ministry of Health, at a Press conference on Nov. 5.

Deaths from respiratory tuberculosis, which rose sharply during the first two years of war, have declined. The number of deaths—5,297 during the June quarter of this year—is below the number (5,540) of the corresponding quarter of 1939. Deaths from tuberculous meningitis are above the 1939 level, but other forms of tuberculosis are now in the same position as in 1939. There were fewer deaths from all forms of tuberculosis during the second quarter of 1943 than in the same period of 1939. While this is a gratifying position, Sir Wilson gave a warning that an increase may occur in the future, as there was a 3% increase in cases last year.

The epidemic of cerebrospinal fever which broke out during the early months of the war has been gradually subsiding, and this disease now approximates to the pre-war level. During the June quarter of this year there were 198 deaths, compared with 152 in the second quarter of 1939.

Notifications of some infectious diseases have risen, and measles, scarlet fever, and whooping-cough are more prevalent now than at the same time last year. The slight increase is insignificant and due to the periodic nature of these diseases. The low prevalence of enteric fever was "really astonishing," as it was usually commoner in war than in peace.

The decline in the cases of and deaths from diphtheria continues. Immunization was being steadily and successfully continued, and during the first half of this year 650,000 children were immunized, an average of 25,000 a week. During the eighteen months Jan., 1942, to June, 1943, deaths from diphtheria, among children, numbered 2,148, and in only 62 of these had the children been immunized. The total number of deaths from diphtheria during the June quarter was the lowest ever recorded in any year.

Discussing the infant mortality, Sir Wilson said that more intensive study of this problem was required. Although the figure was declining and the rate of the September quarter was expected to be the lowest ever recorded for a third quarter, the rate for Britain compared unfavourably with some other countries. In many of the large cities of the United States the infant mortality was well below 40, and if this could be done in America it could be done here when conditions made a new campaign possible.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

N. Whittaker, M.B., B.Chir., has been approved for the degree of M.D. in absence. The degrees of M.B., B.Chir. were conferred by proxy upon J. W. Fawcett at a Congregation held on Oct. 30.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The Duke of Gloucester has honoured the College by accepting its Honorary Fellowship. This forms a fitting climax to the celebration of the centenary of the F.R.C.S. and is particularly pleasing because it enables the Council to show appreciation of His Royal Highness's work for the sick and wounded in his capacity as President of the War Organization of the British Red Cross and Order of St. John, King Edward's Hospital Fund for London, and the British Empire Cancer Campaign.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH

At the quarterly meeting of the College held on Nov. 2, with the President, Dr. Charles McNeil, in the chair, Dr. Ian Murray (Glasgow) and Dr. Harry Stalker (Edinburgh) were introduced and took their seats as Fellows of the College.

The Hill Pattison-Struthers Bursaries in Anatomy and Physiology, and Clinical Medicine, were awarded to William Rhind Brown and Peter Douglas Kemp, respectively.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

By order of the Council, Regulation 3 for the D.R.C.O.G., relating to practitioners who have not fulfilled the requirements of Regulation 2 in respect of resident appointments, will be suspended after March 1, 1944, for the duration of the present emergency.

Medical News

The address of the National Smoke Abatement Society is now: Chandos House, Buckingham Gate, Westminster, S.W.1.

The British Institute of Philosophy announces a lecture entitled "Our Knowledge of Other Minds," to be given by Mr. D. M. Mackinnon at University Hall, 14, Gordon Square, W.C., on Friday, Nov. 26, at 3 p.m.

A conference on the causes and prevention of pre-natal and neonatal deaths will be held on Thursday, Nov. 25, at 4.30 p.m. in the Council Chamber, Paddington Town Hall, with Dr. G. de Swiet in the chair.

At its next sessional meeting in Chesterfield Town Hall on Nov. 27, at 10.30 a.m., the Royal Sanitary Institute will hold a discussion on houses of the future, with special reference to the housewife's needs. The honorary local secretary is Dr. J. A. Stirling.

A refresher course in tuberculosis for general practitioners will be held on Thursday afternoon, Dec. 16, and all day Sunday, Dec. 19, at the Medical Society of London, 11, Chandos Street, W.1. The course has been arranged by the Joint Tuberculosis Council and National Association for the Prevention of Tuberculosis Joint Committee on Education, in collaboration with the Local Medical and Panel Committee for the County of London and the London Public Medical Service. The fee is £1 11s. 6d. An applicant who is a member of the London Public Medical Service may have the fee remitted by that body and deducted from his account. Early application should be made to Dr. Harley Williams, Tavistock House North, W.C.1. Lecturers and subjects are as follows: Dr. Joseph Smart, "Modern Methods of Diagnosis"; Dr. James Maxwell, "Some Points in Home Management"; Mr. T. Holmes Sellors, "Collapse Therapy"; Dr. Peter Kerley, "Diagnosis by *X* Rays"; Dr. C. H. C. Toussaint, "Facilities offered by Local Authorities for the Prevention, Diagnosis, and Treatment of Tuberculosis"; Dr. W. P. H. Sheldon, "Tuberculosis in Children"; Dr. Andrew Morland, "The Peculiarities of Tuberculosis."

The Government of India has appointed a committee, with Sir Joseph Bhore as chairman, to investigate all aspects of public health in India, both curative and preventive. The committee is part of the Government plan for post-war reconstruction. It will first survey the whole field, including health and medical relief services, health education and propaganda, nutrition, industrial conditions in relation to health, and nursing services, and will afterwards suggest a plan for development. Subcommittees have been set up to deal with public health, medical relief, industrial health, medical education, and medical research.

Surg. Cmdr. George A. Mason, F.R.C.S., has been appointed thoracic surgeon to the British Legion Village (Preston Hall, near Maidstone, Nayland Sanatorium, near Colchester, and Douglas House, Bournemouth). His appointment began on Nov. 1. Since the death on service of Mr. Laurence O'Shaughnessy in the early days of the war, there has been an interruption in major thoracic surgery at Preston Hall, but it is now hoped to utilize Preston Hall as a centre for surgical treatment of patients from all three institutions now under the British Legion.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, LONDON, W.C.1.

ORIGINAL ARTICLES AND LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone unless the contrary be stated.

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B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

ANY QUESTIONS?

Pernicious Anaemia and having Children

Q.—*An apparently healthy woman of 30 has relatives who suffer from pernicious anaemia. (1) Her mother has had it for many years and is under constant liver therapy; she has a proved achlorhydria. (2) Two of her mother's brothers have died from this disease, and a third suffers at present. (3) Her sister at the age of 29 had a subtotal hysterectomy for fibroids and very nearly died after the operation from haemorrhage of haemophilic type; she was saved only by numerous blood transfusions; she was later found to have a colour index over 1 and an achlorhydria. The woman refuses to undergo blood or gastric juice investigation, but insists that it will be quite safe for her to have a child. Should this woman have a child from the point of view of (a) her own safety at parturition, and (b) the child inheriting a tendency to a haemopoietic disorder?*

A.—The woman's refusal to undergo investigation of the blood or gastric juice is probably based on the fear that pregnancy will be forbidden if an abnormality is found. In this connexion it should be remembered that precipitation of pernicious anaemia in predisposed subjects during pregnancy is rare, and that not a few patients with known pernicious anaemia have now been safely taken through pregnancy. As regards the argument that the child may inherit a tendency to haemopoietic disorder, surely the choice must be left to the woman. It is no more than even chances that she herself has a tendency to pernicious anaemia. Even if she has, not more than half her children are likely to inherit this tendency, and not all with the tendency will develop the disease. Since pernicious anaemia rarely develops until late in life, and can be completely controlled by treatment, the argument for forbidding conception because of the risk of transmission of suffering is not very strong. The woman should therefore be permitted to have a child if she desires one strongly, but in return she should agree to the examination of her blood monthly during the first seven months, and fortnightly during the last two months of pregnancy. The blood should also be grouped. With these precautions there should be no risk of the development of an uncontrollable state of anaemia.

What is a Yawn?

Q.—*What is the function, or purpose in Nature, served by the yawn? Information as to the physical mechanism effecting this phenomenon would also be welcomed.*

A.—Considering the frequency of occurrence of yawning in the human subject, it is surprising to find so little reference to it in the literature. None of the standard textbooks makes any reference to it, and there does not appear to be any experimental work on the physiology of its causation. Yawning consists of a full and slow inspiration, with wide-open mouth, which is held for a second or two and followed by a fairly rapid expiration. It is usually accompanied by extension—"stretching"—of the limbs and trunk. In man it usually seems to occur when a mild degree of cerebral anoxia is likely and when the respiratory centre may be slightly depressed—e.g., after sitting for some time in a warm, close atmosphere, on waking, or under conditions leading to boredom and relaxation of attention. In these cases it seems likely that there is some reduction of cerebral blood flow, and a consequent anoxia. Yawning is also reported in individuals resting at high altitudes

and in some forms of epidemic encephalitis. There does not appear to be any record of its occurrence as a result of muscular fatigue unassociated with mental fatigue, or in any conditions where a full cerebral flow of well-oxygenated blood is assured. In the infant it is an early form of response and has been reported as occurring within five minutes of birth.

Breathing is controlled through a central respiratory mechanism which, according to Lumsden, consists of pneumotaxic, apneustic, and gasping centres, or, more recently, according to Ranson and his co-workers, of inspiratory and expiratory centres. The activity of pneumotaxic and apneustic centres, or inspiratory and expiratory centres, is co-ordinated through reflexes. Interference with these reflexes affects the pattern of breathing. Although there is little experimental evidence to warrant it, a comparison may be made between yawning and the apneustic type of respiration which occurs when the upper part of the pontine portion of the respiratory regulating centre is interfered with; apart from section of the brain stem, anoxia induced by a variety of methods may induce apneustic breathing, and it is assumed in these cases that the depression of the centre by anoxia occurs from above downwards. Yawning might be regarded as due to unopposed action of the apneustic or inspiratory centre owing to anoxic depression of the pneumotaxic centre or the co-ordinating reflexes. The increased oxygenation of the blood and its more rapid circulation, caused by the deep inspiration of yawning and the associated muscular movements, will lead, at least temporarily, to the disappearance of the depression. Some observers, however, regard yawning as a form of emotional behaviour, particularly in animals. Charles Darwin in *Expression of Emotion in Man and Animals* refers to yawning in baboons and some of the smaller monkeys as a sign of apprehension or anger; and, in dogs, yawning, apart from occurring in similar circumstances to those causing it in man, is often seen when the animal is apparently puzzled. It is difficult to see any connexion between these types of yawning and that which may be caused by anoxia. Nor does the anoxic theory explain the "infectious" yawning which may be induced in a group of people by one individual acting as a stimulator. There is some experimental evidence that this group response can be induced independently of the environment, though it is usually influenced by it.

Chlorine and Phosgene Gas Poisoning

Q.—*What immediate steps should be taken in the management of chlorine and phosgene gas casualties before they are admitted to hospital? Is it, for example, necessary for them to pass through a gas-cleansing station? If the hospital to which they are sent has facilities for treatment but no cleansing station attached, what is the proper course to pursue?*

A.—Casualties poisoned by phosgene gas, or, rather, lung-irritant gases, or suspected of being so poisoned, should be warmly wrapped in blankets, placed on a stretcher, labelled with the symbol XX on a plain luggage label, and sent as soon as possible in an ambulance from the incident *direct* to a hospital. Where the incident occurs at a distance from a hospital, and there is no ambulance immediately available to convey the casualties there, they should be conveyed on stretchers to a first-aid post or other suitable place under cover, where they can be kept quiet and warm and under proper supervision till they can be taken to hospital. Warmth and complete physical rest in the fully recumbent position are essential for these cases whilst they await transfer to a hospital, as the danger to be feared is the onset of pulmonary oedema. Hot sweet tea may be given at this stage.

Chlorine and phosgene gases are both non-persistent gases. No decontamination of the clothing and no cleansing of the person is therefore necessary. Indeed, any attempt to cleanse such persons will tend to accelerate the onset of the pulmonary oedema and so must be avoided. Persons exposed to the non-persistent gases are *not* contaminated, their clothing does *not* require removal, they must *not* be labelled with the symbol C, and they can be transported in an ambulance without contaminating it or the blankets in which they are wrapped.

The questioner would do well to read the two books, A.R.P. Handbook No. 2, 4th edition, May, 1943—*First Aid and Nursing for Gas Casualties*, price 4d.; and *The Medical Manual of Chemical Warfare*, Feb. 28, 1943, price 2s. 6d. net.

Incomplete Erection

Q.—*A patient of 30, after psychotherapy for semi-impotence and diminished desire, has now almost recovered his previous full powers. Before the psychotherapy a neurologist had excluded organic disease. However, complete erection is confined to the corpora cavernosa penis. That in the corpus cavernosum urethrae and glans penis remains partial. Is this likely to be an organic or a psychogenic disability—and would any further treatment be of use?*

A.—An incomplete erection of this kind is almost certainly psychogenic in origin. The fact that it has been so accurately described by the patient to his doctor suggests that the patient is still preoccupied with the state of his organ during intercourse. Instead of his attention being on his wife and his mind filled with sexual excitement, he is noting the exact state of his penis, wondering whether it will get more rigid, anxious lest the erection should subside, etc. In other words, the higher centres in the brain are interfering with, instead of stimulating, the erection centre in the cord. If a man is preoccupied with the state of his stomach and with the sensations coming from it after a meal he will eventually bring about a disturbance of its natural activity. In the same way the mind can easily derange the equally mechanical activity of erection.

Spasmodic Torticollis

Q.—*Can you help me with a case of acute torticollis in a woman of 34? This began with spasm of the right sternomastoid about three months ago. It was then painless. She has had encouragement and phenobarbitone, which did no good at all. She is now in bed; and when she is lying down the spasm, which is now painful, entirely disappears. Massage makes her worse. The spasm recurs as soon as she raises her head from the pillow. She has seen a psychologist, who did not think the condition was psychological.*

A.—If a psychiatrist has excluded a hysterical cause for spasmodic torticollis with certainty, the outlook is unfavourable. More often than not the disorder has a physical basis, and indeed structural changes in the basal nuclei have been described. The story of a gradual onset and relief by lying down or by sleep is typical. Treatment is very difficult. Some patients can inhibit the involuntary movements by holding the chin lightly, but springs which have been advised for the same purpose are usually unsuccessful. Surgical treatment—section of the spinal accessory nerve, the motor roots of the upper cervical nerves on that side, or of the motor and sensory nerves—may give great relief. This is usually temporary, since, as the condition is due to a central disorder, other muscles take up the movement. Large doses of sedatives should be tried, but antispasmodics such as stramonium and atropine are disappointing. When torticollis is not hysterical in origin it is liable to persist.

Ascites in Case of Malignant Ovary

Q.—*In a case of ascites due to malignant disease of the ovary it is impossible to remove much fluid because of clotting in the cannula or tubing. How can this be avoided? Would injection of 30% sodium citrate into the peritoneal cavity be of any help?*

A.—The premise seems to be faulty. Ascitic fluid due to malignant disease of the ovary is usually thin and easily removed by tapping; rapid clotting is not a special feature. The cannula used may have been too small; or, more likely, it has penetrated a walled-off portion of the abdominal cavity. If the fluid is thick and jelly-like, pseudomyxoma peritonaei should be suspected; in these cases it is necessary to open the abdomen in order to evacuate the tenacious secretion. If the diagnosis has not already been clinched by exploratory laparotomy, this should still be done. Injection of sodium citrate is not likely to be helpful because, even if it influenced clotting, it would be difficult to get it to mix intimately with the large quantity of intra-abdominal fluid presumably present.

Neurofibromatosis

Q.—*A patient aged 50 suffers from a multiple neurofibromatosis. He has the swelling over the whole body and new ones are continually growing. As they grow they are very painful. Is there anything I can do to check or cure this distressing complaint? He has tried thyroid medication but without any real effect. (I might mention that he suffers from occasional allergic reactions to certain foods.)*

A.—In generalized neurofibromatosis of this sort I do not think any specific treatment of avail. Large, painful fatty swellings or small superficial fibromata can be excised, but the condition is a neoplastic one, quite unlikely to respond to endocrine or dietary treatment. Death is often caused by the onset of malignant changes in some of the tumours, or by intracranial pressure caused by a fibroma in the acoustic nerve.

Sulphonamides for Dysentery and Colitis

Q.—*Have the sulphonamides, or a variant, been used in the treatment of colitis and dysentery? A nephew of mine has been troubled, ever since his service in H.M. Forces during the last war, with colitis. To my knowledge he has not had an examination of the faeces to establish the presence or absence of a Shiga or Flexner bacillus (he has not been under any professional care). His health has been undermined by these attacks, in spite of which he insists upon taking an active part in Civil Defence. I have a vague recollection of having read in the "B.M.J." of sulphonamide medication being tried in his complaint. I should be grateful for some information on this point.*

A.—Several of the many recent papers testifying to the value of sulphaguanidine in the treatment of acute bacillary dysentery appeared in this *Journal*. Sulphaguanidine is a drug of low solubility, the greater part of which is consequently retained in the bowel and acts there; other sulphonamide compounds are

completely absorbed long before the colon is reached, and therefore act only in the tissues and not in the lumen of the bowel. Succinyl-sulphathiazole ("sulphasuxidine") is a newer compound of the same type; even less of it is absorbed, and it may prove to be superior for intestinal treatment even to sulphaguanidine. There is less information about the treatment of ulcerative colitis, with varying results, possibly because the disease so named has various causes. In this case there should be at least a simple naked-eye and microscopical examination of the faeces to decide what type of colitis exists, and possibly a sigmoidoscopy. If there is reason to regard it as infective (pus in the stools; ulcers demonstrated), a course of sulphaguanidine might be tried—say 2 g. four times a day for a week. Larger doses of succinyl-sulphathiazole can be given with no danger of any toxic effects.

Sterilizing Blades and Needles

Q.—*What are the best methods of sterilizing scalpel blades and suture needles for operations?*

A.—The only simple rapid and certain way of sterilizing any surgical instrument is to boil it for 5 minutes in water containing 2% sodium carbonate. This proceeding, unlike boiling in plain water, can be depended on to kill all bacteria, including spores. The widespread belief that either boiling or dry heat (150° C. for 1 hour in a hot-air oven—also fully efficient) reduces the sharpness of cutting instruments has been contested; if such a change occurs its degree is slight. Sterilization by chemical means is best achieved by solutions containing formalin: Borax 1.5 g., formalin 2.5 c.cm., phenol 0.4 c.cm. aq. dest. ad 100 c.cm. The following has also been recommended recently: Borax 0.1 g., ac. boric. 1.5 g., *p.*-chlor-*m*-cresol 0.2 g., spirit. 5.0 c.cm., aq. dest. ad 100 c.cm. (The borax in these solutions prevents rusting.) Spirit, though extensively used with impunity, is an unreliable sterilizing agent. It is totally without action on spores, and may even not kill pyogenic cocci if they are protected by a layer of albuminous material, as may happen on an imperfectly cleaned instrument. For maximum effect it also requires dilution to 70% strength, in which steel instruments rust.

Phosphorus Burns

Q.—*In some of the London sections of the N.F.S. a 2% solution of sulphate of copper was issued for application to phosphorus burns, which was to be applied after an initial application of an alkaline solution. Is there a good reason for the withdrawal of the copper sulphate solution?*

A.—Burning phosphorus produces acids, and the penetration of these into the tissues aggravates the burn and delays healing. The object of an alkaline solution as an initial application is to neutralize such acids as quickly as possible. The object of the copper sulphate solution is to cover any adherent phosphorus with a dark and easily visible coat (probably a mixture of copper phosphide and metallic copper) so that re-ignition of the phosphorus is inhibited and an opportunity is given for the visual location of any fragments of phosphorus still adherent and their removal. So long as there is reason to suspect the presence of elemental phosphorus the application of copper sulphate remains a necessary procedure.

Moulds on Leather Cases

Q.—*I have a number of leather cases—e.g., midwifery, emergency, dressings, diagnostic, etc. These were stored in a cupboard in my surgery, and after a few weeks became coated with mould. Since then I have found it difficult to keep them free from mould. I would be very glad to hear of any suggestions.*

A.—Moulds are present in the air almost everywhere, ready to inoculate substances like leather the moment they become wet. An application of thymol dissolved in spirit in the proportion of 4 to 6 g. per litre is used by the leather trade to free and preserve leather from mould.

Post-herpetic Neuralgia

Q.—*A patient had facial herpe three years ago. Since then there has been continuous pain in the affected side of the head, made worse by cold and windy weather. I remember reading somewhere that galvanism is of use in such cases. Can you give details of this, or any other form of treatment which might lead to a cure? I am told that various analgesic drugs have been tried without success.*

A.—Treatments of post-herpetic neuralgia are legion. Physical measures include local infra-red and ultra-violet irradiation, often combined with general ultra-violet irradiation, galvanism, diathermy, and short-wave therapy. Details of application will be found in any textbook of physiotherapy. *X*-ray treatment has been recommended by some authors and condemned by others. Local treatment includes light cauterization with the Paquelin cautery and infiltration of the affected areas with procaine solutions. Injections of alcohol into the affected nerves or ganglia and section of nerve roots or tracts have proved of little value. General measures, such as autohaemotherapy and injections of pituitary extract or vitamin B_1 have had cures in some hands and failure in others. Success has recently been claimed from the intramuscular injection of cobra venom in a dosage of 5 mouse units (1 c.cm.) daily.

Iritis

Q.—*An attack of iritis in 1936 left me with two posterior synechiae and a small corneal opacity. Otherwise the eye recovered except that it became easily strained and painful after a few hours' reading. All investigations have been made, and nothing abnormal found except septic tonsils, which have been removed. Now, in 1943, I have had another flare-up of iritis for no apparent reason. Are the synechiae in any way responsible for the recurrence? If so, is it advisable to have them broken down by subconjunctival injection of mydricaine; or, alternatively, what else is suggested to avoid any further recurrence? As every attack of iritis is liable to leave a little corneal opacity, what is suggested as the best treatment for a quick and certain resolution?*

A.—There is no valid reason for assuming that synechiae are themselves a cause of iritis. That belief prompted the now obsolete operations for surgical division of synechiae. The use of subconjunctival mydricaine (atropine, adrenaline, and cocaine compound) would be harmless, but is unlikely to prevent relapses, for which some tangible cause must surely be present. Knowledge of the aetiology of recurrent iritis is unfortunately rather sketchy. As for the corneal opacities, these represent either an associated corneal reaction or deposits of precipitates at the back of the cornea ("K.P."), and there is no treatment for these apart from the treatment of the underlying condition.

Speculation

Q.—*How electroshock therapy produces the results it does produce is still a matter of controversy. An attractive hypothesis is that there is a stimulation of the pituitary gland, which then further stimulates the endocrine orchestra. If this were so, convulsive or even subconvulsive therapy should restore a case of myxoedema to normality. I should be interested to know if electroshock has been used for such cases, and to what end. Not only would such knowledge be an addition to the electroshock therapist's armamentarium, but it would also be a pointer as to whether the action is on the brain cells per se, or on the pituitary gland.*

A.—A hypothesis should be based on observed facts. To the best of my knowledge there are no observed facts to support the suggestion made in this question. A general stimulation of the pituitary would be expected to produce an increase in (1) gonadotrophic function, resulting in ovarian or testicular overactivity; (2) thyrotrophic function, resulting in thyroid overactivity; (3) adrenotrophic function, resulting in adrenal cortical overactivity (electrolyte changes, oedema, and possibly a condition resembling Cushing's syndrome); (4) growth, producing gigantism in the young and acromegaly in adults; (5) the diabetogenic function, producing diabetes or at any rate carbohydrate intolerance; (6) less well-defined effects on gastric secretion and blood formation; (7) high blood pressure, hyperchromic anaemia, achlorhydria, diabetes, and oliguria (the posterior pituitary syndrome of Idris Jones). None of these effects is, in fact, observed.

LETTERS, NOTES, ETC.

Epidermolysis Bullosa

Dr. HUGH S. STANNUS (London, W.1) writes: In your issue of Nov. 6 (p. 597) there is a question *re* epidermolysis bullosa. In the answer no mention is made of the paper by Schwartzman, J., *et al.* (*Amer. J. Dis. Child.*, 1941, **62**, 352) on Ritter's disease, and treatment which appeared to be followed by satisfactory response. The child was 1 month old. The treatment was 2 mg. riboflavin three times daily, cod-liver oil, and a syrup containing the vitamin B_1 complex.

Shortened Puerperium

DR. G. F. BARHAM (Gorran, Cornwall) writes: May I add another personal experience of shortened puerperium. My wife had her 4th confinement in 1920 at the Maternité Clinic, Lausanne (3 previous confinements in England with the usual 2–3 weeks lying in). She was allowed up on the 3rd day, left the clinic about the 6th day, and I recall that we went to the theatre on the 14th day and returned to England, with 4 children, on the 21st day. We have never had any reason to regret this. My purpose in quoting this experience is to draw attention to the fact that at this admirable clinic this procedure was, 23 years ago, the normal practice in uncomplicated cases, and to put in a plea that, in consideration of the enormous economic advantage of the shortened puerperium, both to the patient and to maternity accommodation, inquiry might be made at Lausanne and other similar foreign institutions as to whether their experience and statistical results have caused them to modify their practice.